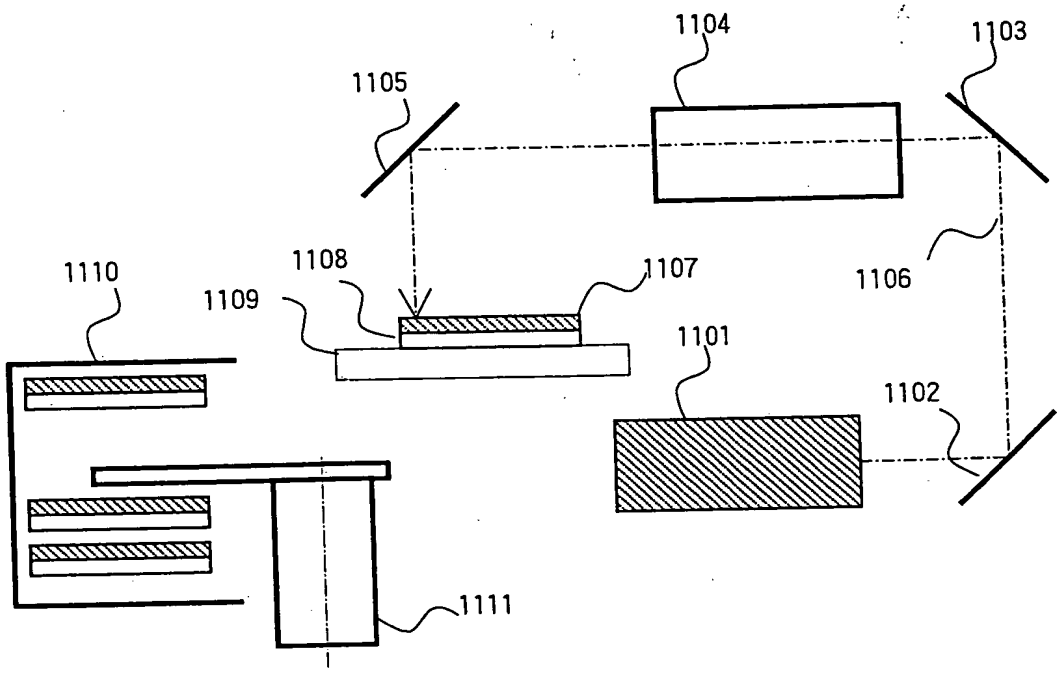


SCHEMATIC DIAGRAM OF CONVENTIONAL EXCIMER LASER ANNEALER

FIG. 1 PRIOR ART

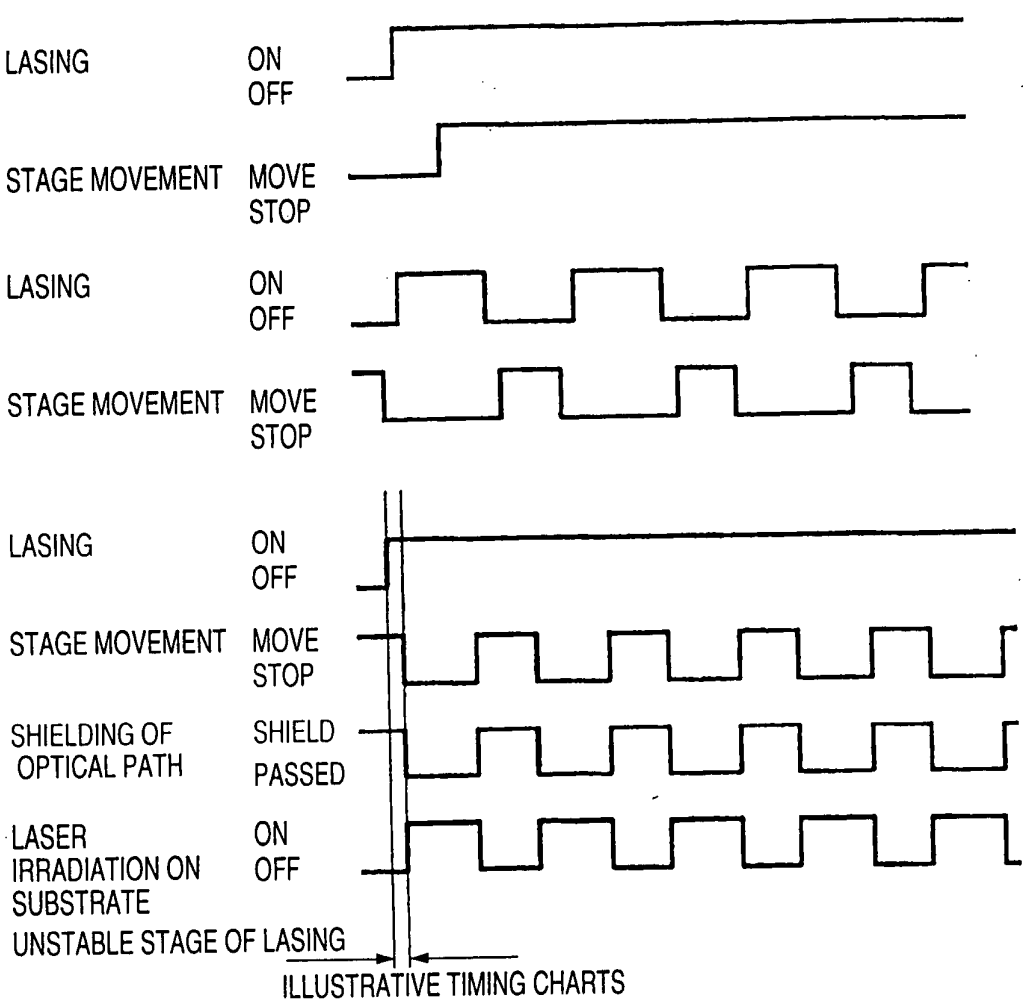


FIG.2A
PRIOR ART

FIG.2B
PRIOR ART

FIG.2C
PRIOR ART

FIG.2D
PRIOR ART

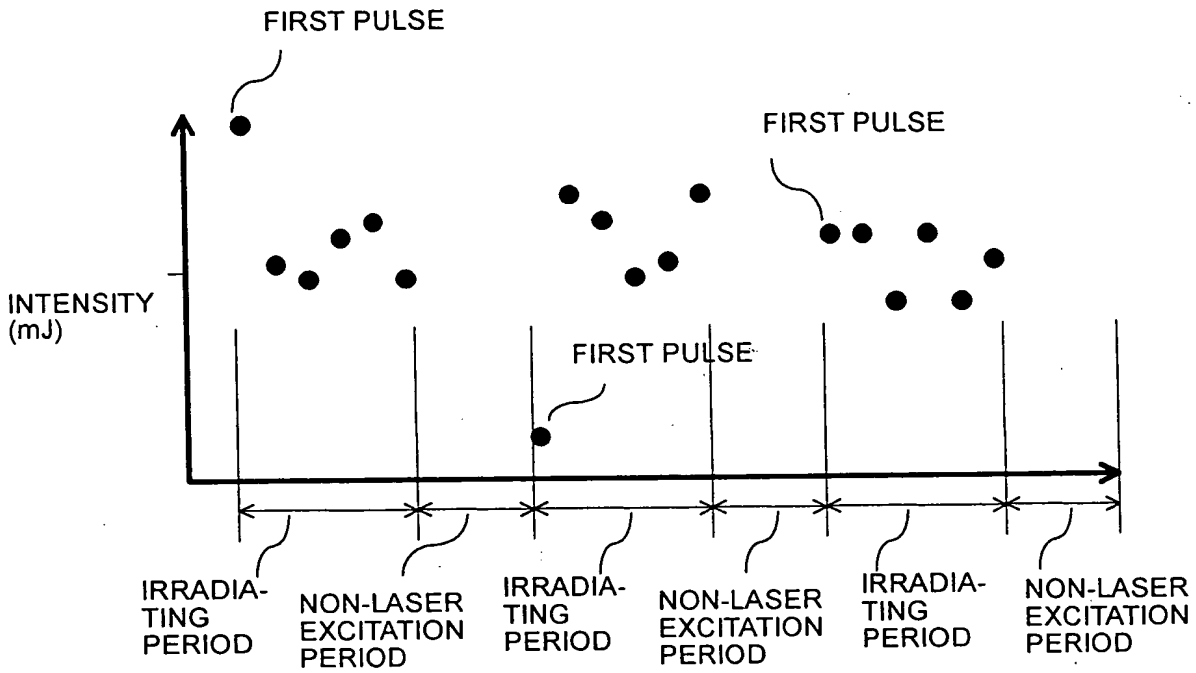

FIRST PULSE
FIRST PULSE
INTENSITY
(mJ)
FIRST PULSE
IRRADIA-
TING
PERIOD
NON-LASER
EXCITATION
PERIOD
IRRADIA-
TING
PERIOD
NON-LASER
EXCITATION
PERIOD
IRRADIA-
TING
PERIOD
NON-LASER
EXCITATION
PERIOD

FIG. 3

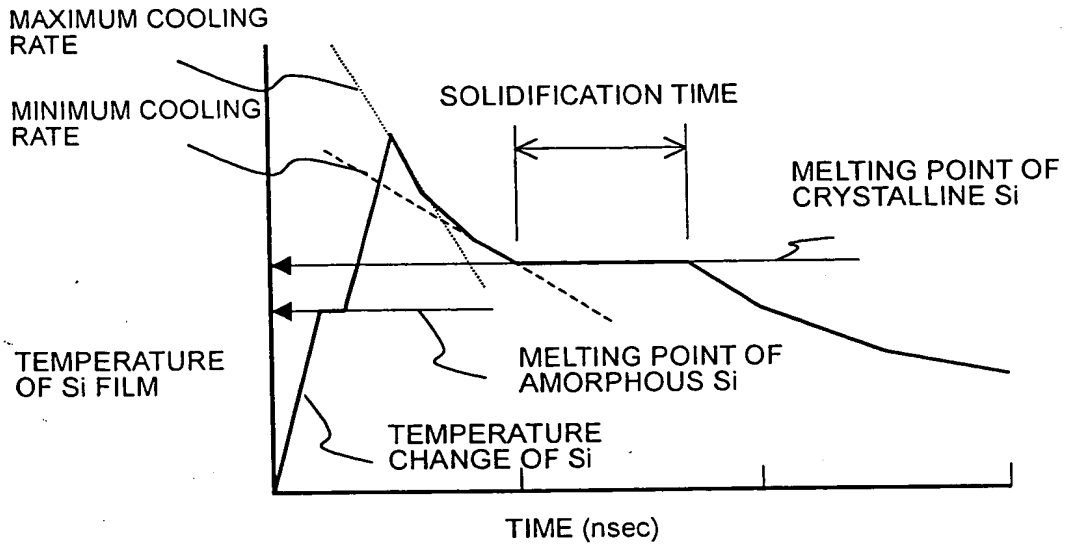
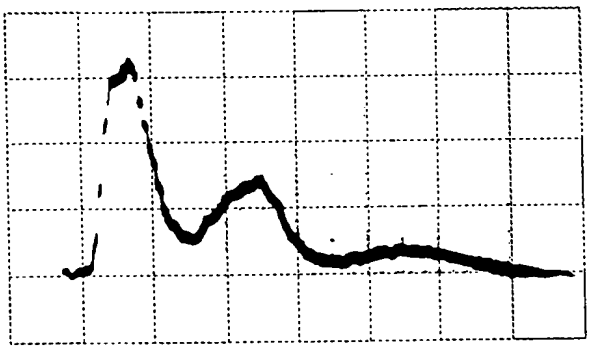
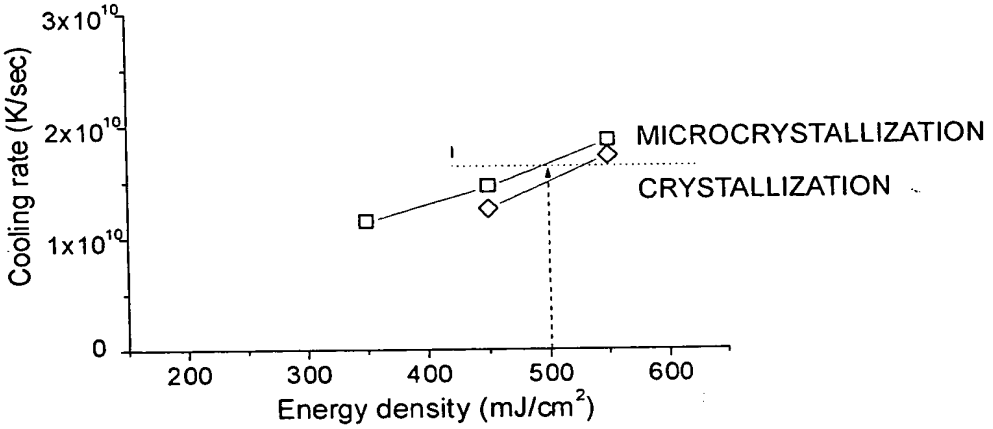


FIG. 4



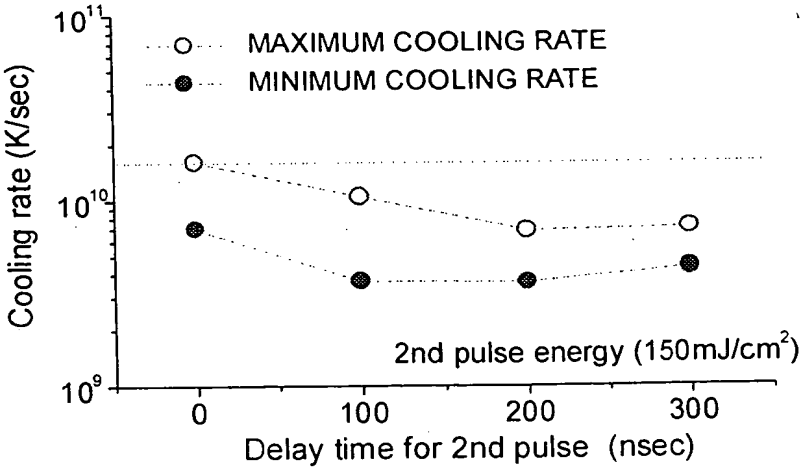
ILLUSTRATIVE LASER PULSE SHAPE

FIG. 5



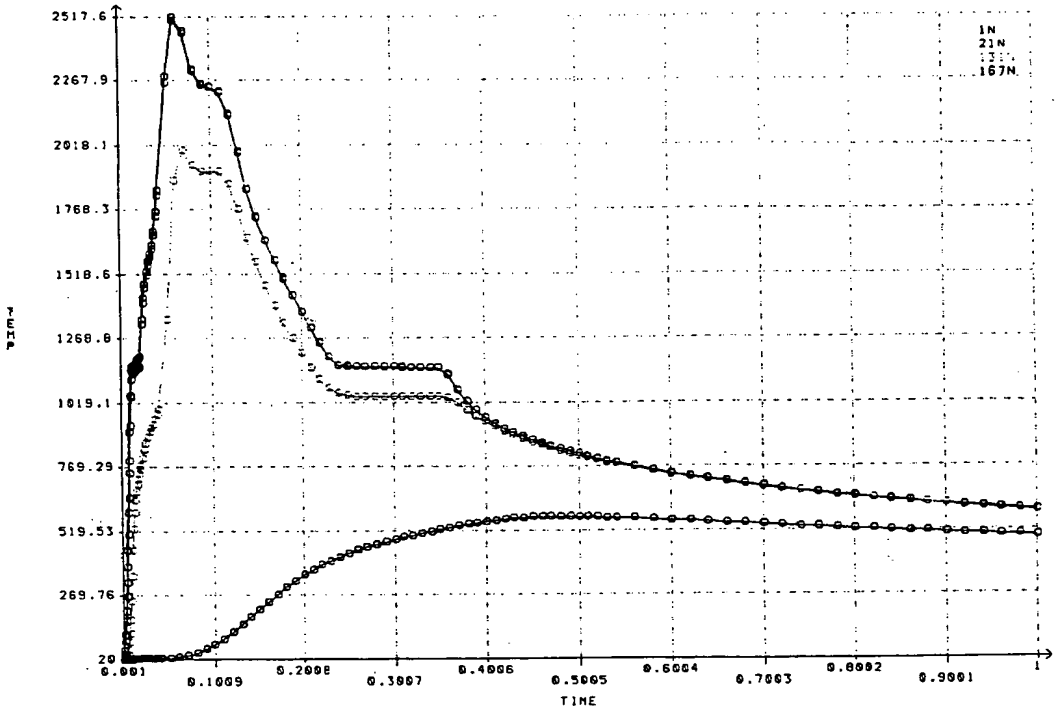
RELATIONSHIP BETWEEN IRRADIATION INTENSITY AND COOLING RATE, AND COOLING RATE AT WHICH THE MATERIAL BECOMES AMORPHOUS

FIG. 6



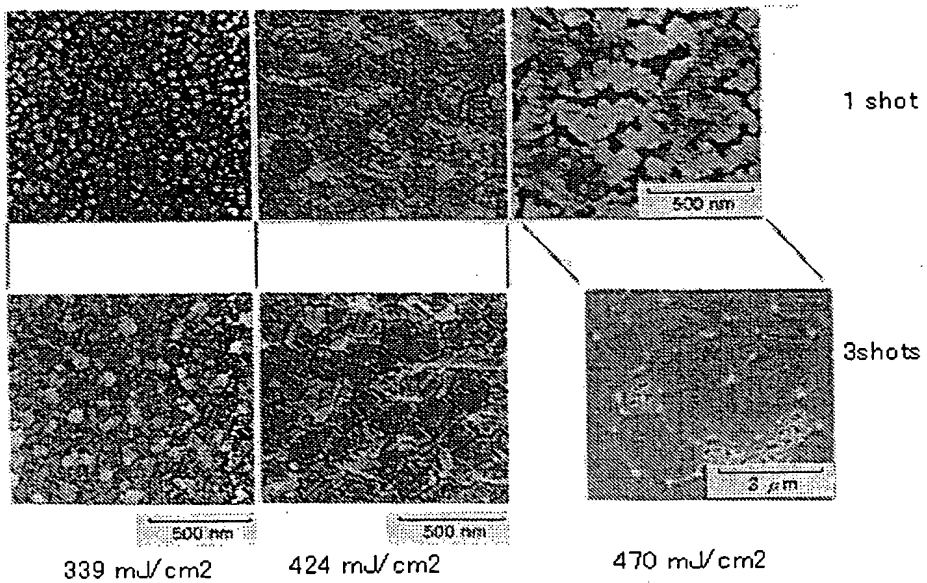
RELATIONSHIP BETWEEN MAXIMUM COOLING RATE AFTER APPLICATION OF SECOND PULSE AND THE COOLING RATE IN THE VICINITY OF SOLIDIFICATION POINT

FIG. 9



TEMPERATURE OF SILICON THIN FILM 75nm THICK ON A SiO_2 SUBSTRATE IRRADIATED AT AN INTENSITY OF 450mJ/cm^2 BY XeCL LASER (WAVELENGTH: 308nm)

FIG. 7



ELECTRON MICROSCOPIC PHOTOGRAPHS OF LASER-INDUCED CRYSTALLIZED FILMS AFTER ZERO-ETCHING RELATIVE TO IRRADIATION INTENSITY AND NUMBER OF IRRADIATION TIME

FIG. 8

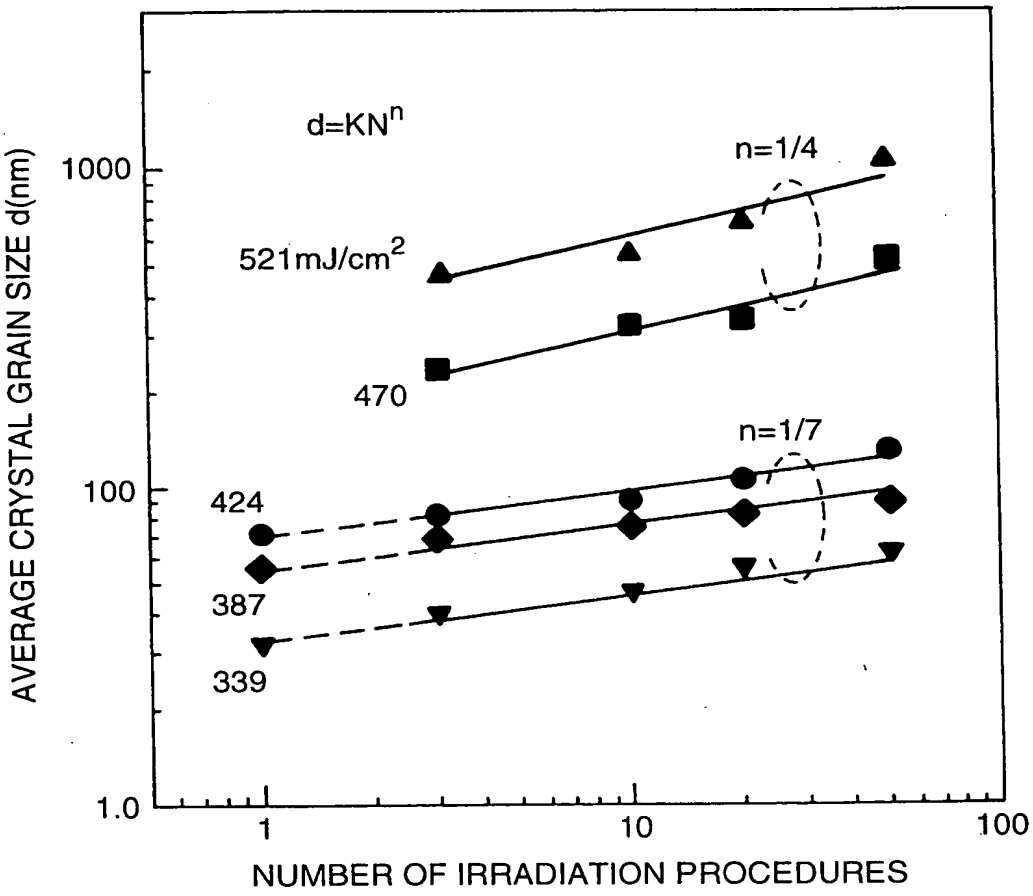

d=KN^n
n=1/4
521mJ/cm^2
470
n=1/7
424
387
339
1000
100
1.0
1
10
100
AVERAGE CRYSTAL GRAIN SIZE d(nm)
NUMBER OF IRRADIATION PROCEDURES

FIG.10

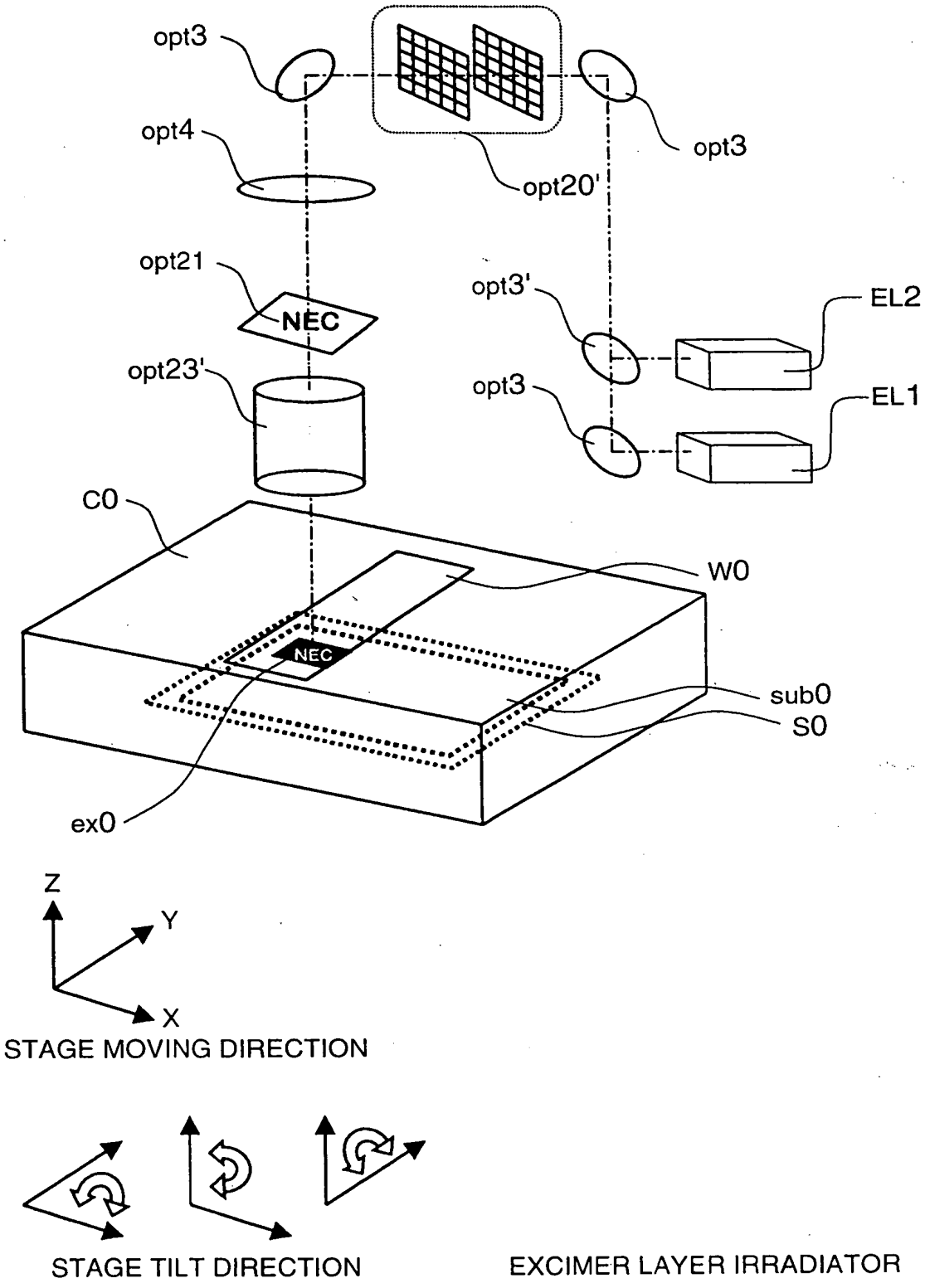
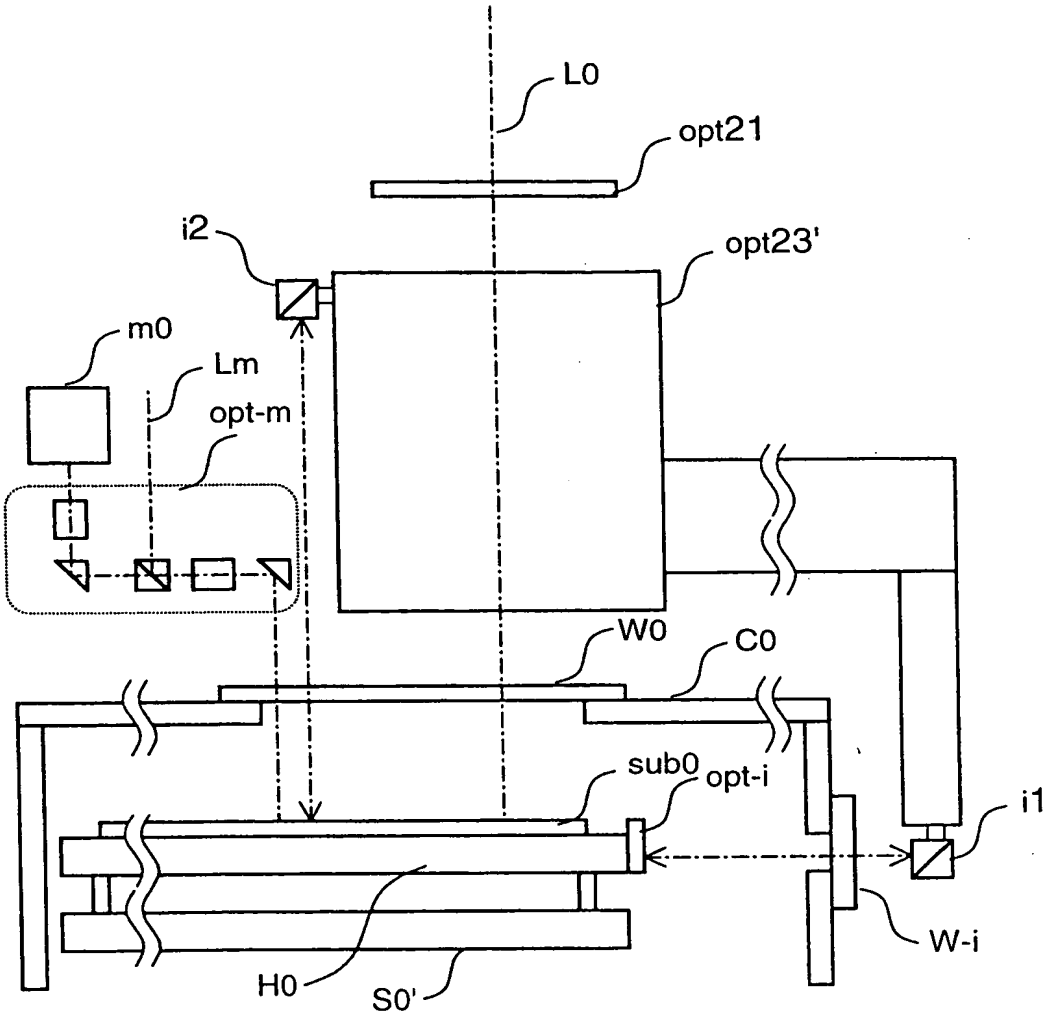

opt3
opt4
opt20'
opt3
opt21
NEC
opt3'
EL2
opt23'
opt3
EL1
C0
W0
NEC
sub0
S0
ex0
Z
Y
X
STAGE MOVING DIRECTION
STAGE TILT DIRECTION
EXCIMER LAYER IRRADIATOR

FIG.11



ALIGNMENT MECHANISM

FIG.12

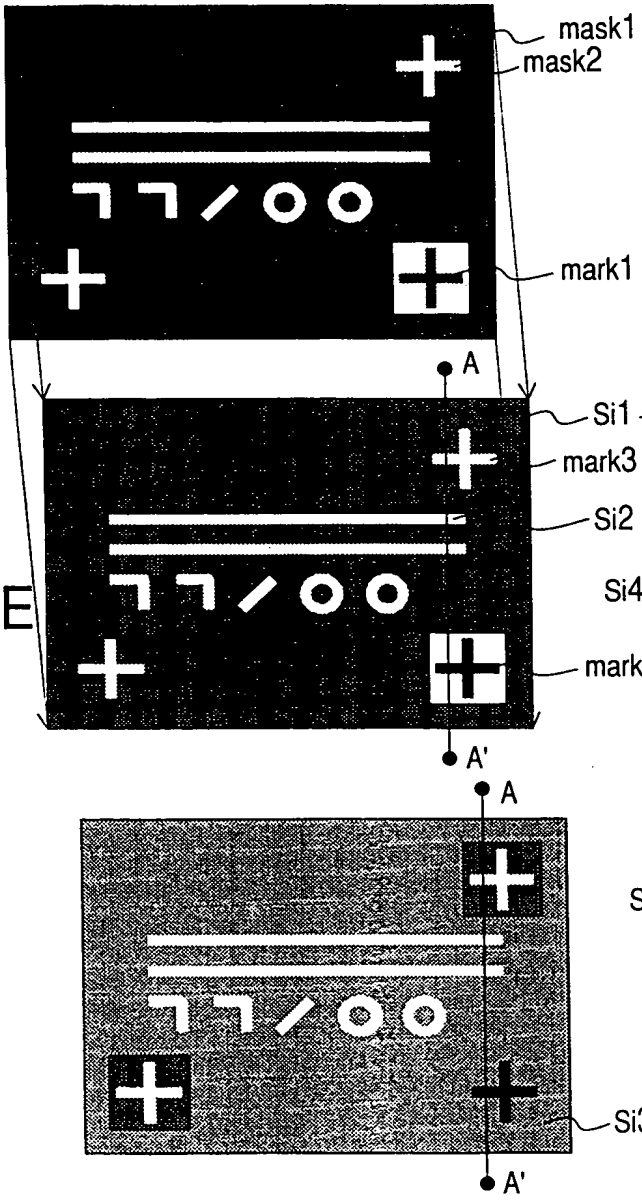


FIG.13A MASK PATTERN

FIG.13B EXPOSURE PATTERN

FIG.13C

FIG.13D ETCHING PATTERN

FIG.13E

PATTERN TRANSFER AND ALIGNMENT IN EXCIMER LASER ANNEALING

ILLUSTRATIVE CONTROL PROCEDURE (1)

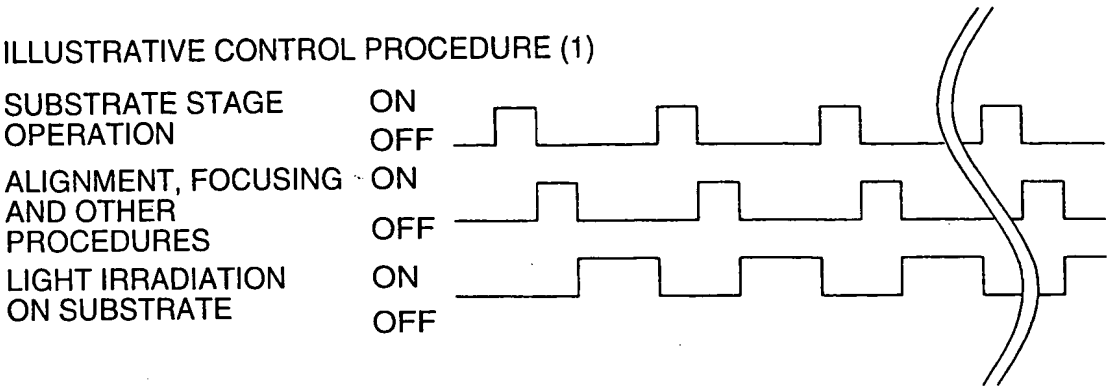


FIG.14A

ILLUSTRATIVE CONTROL PROCEDURE (2)

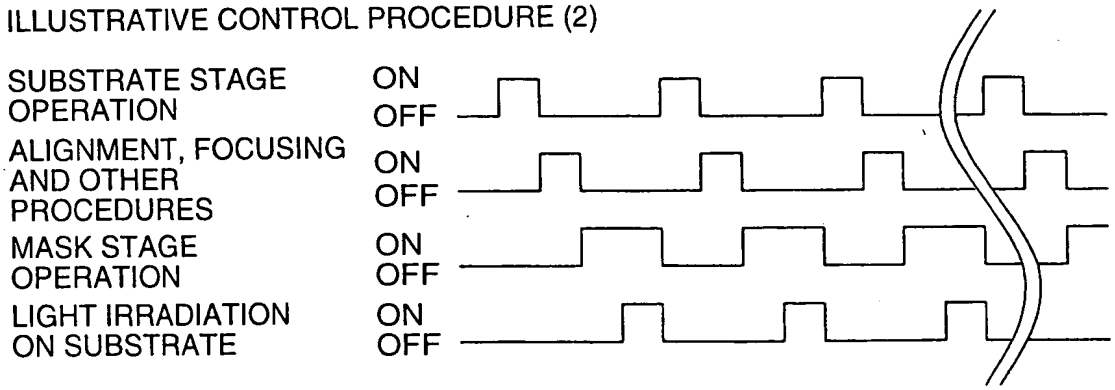
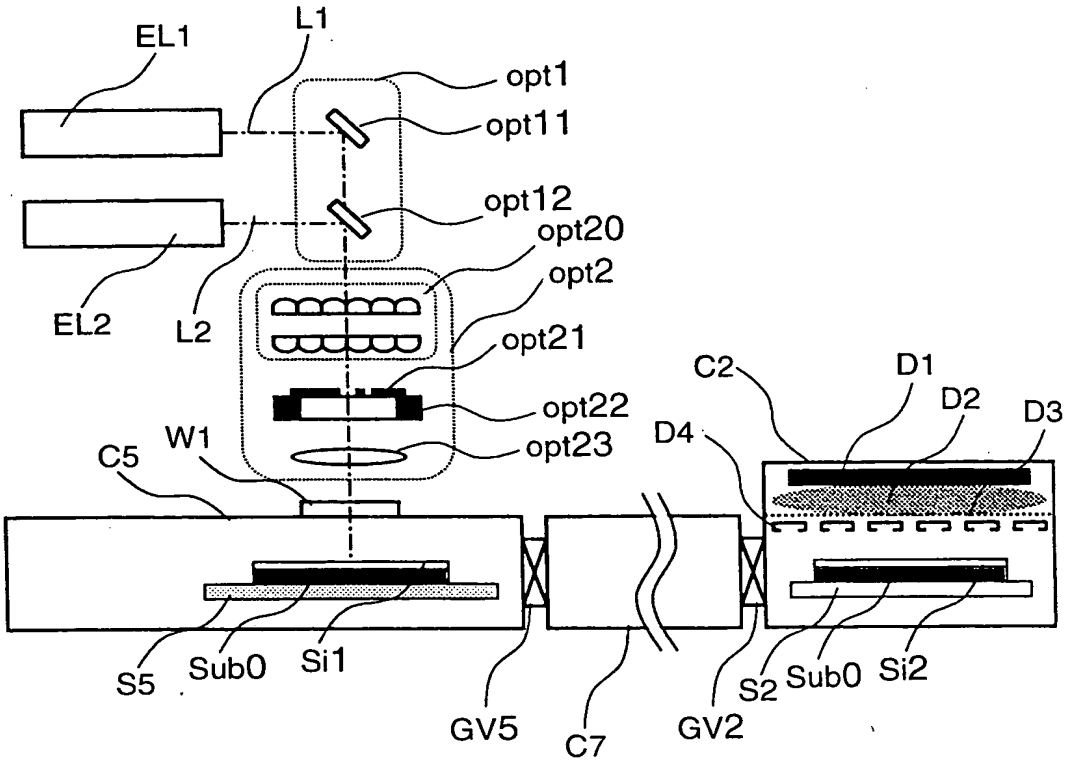


FIG.14B



PLASMA-ENHANCED CVD CHAMBER-SUBSTRATE TRANSFER CHAMBER-LASER IRRADIATING CHAMBER

FIG.15

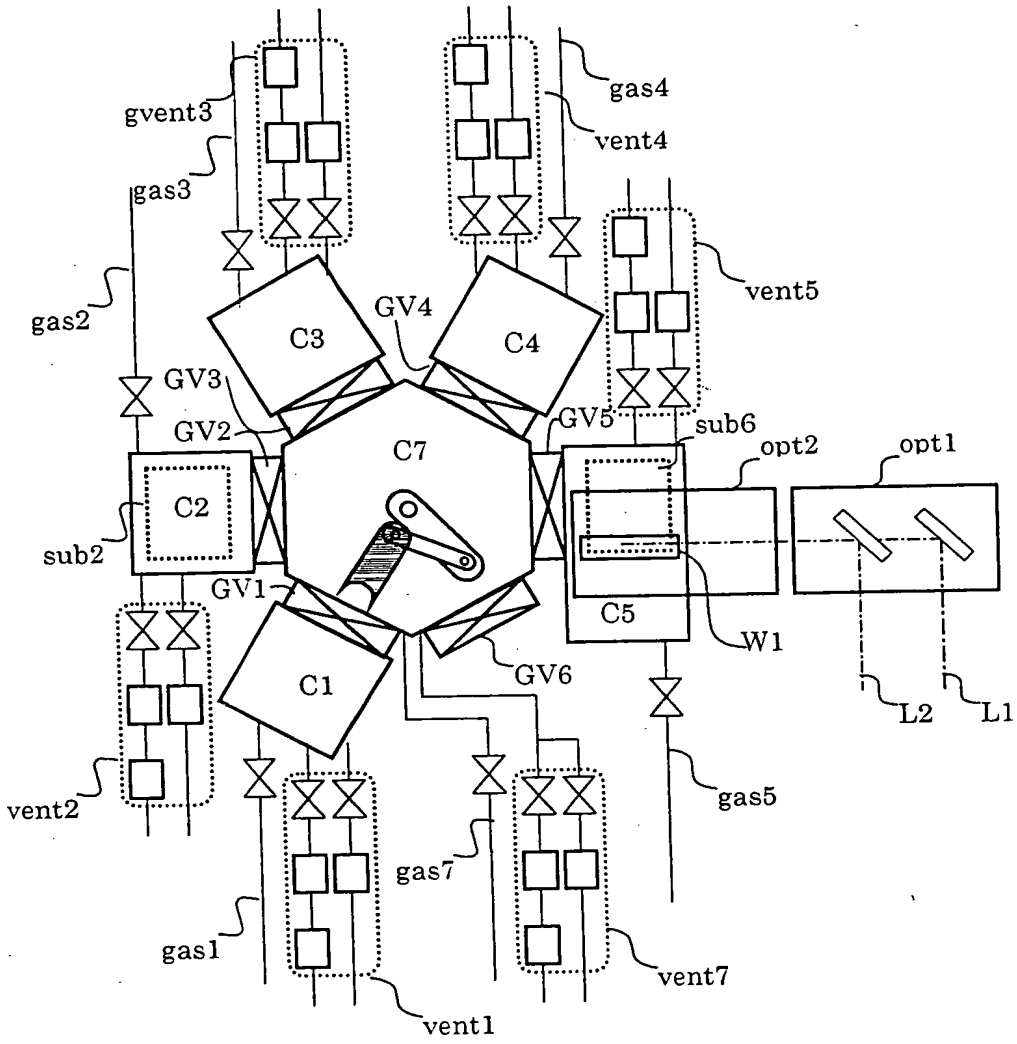

gvent3
gas3
gas2
gas4
vent4
vent5
C3
GV4
C4
GV3
GV2
C7
GV5
sub6
opt2
opt1
C2
sub2
GV1
C5
W1
C1
GV6
L2
L1
vent2
gas5
gas7
gas1
vent7
vent1

FIG. 16

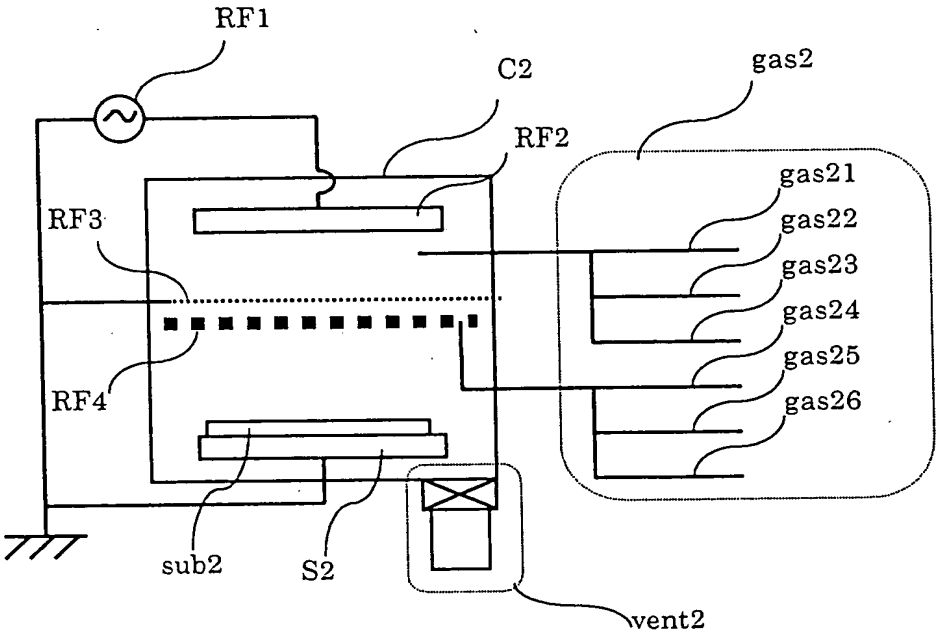

RF1
C2
gas2
RF2
gas21
gas22
gas23
gas24
gas25
gas26
RF3
RF4
sub2
S2
vent2

FIG. 17

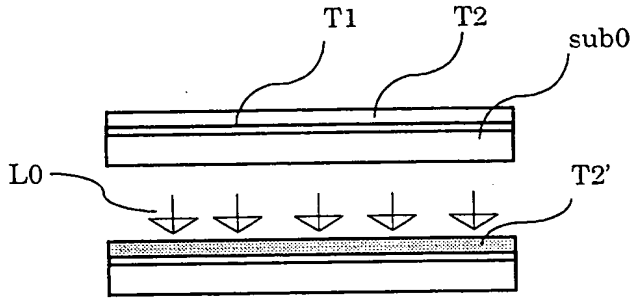


FIG. 18A

FIG. 18B

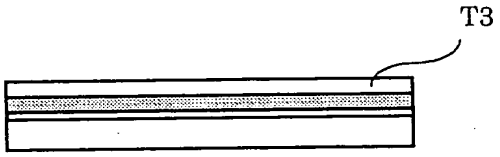


FIG. 18C

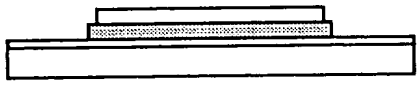


FIG. 18D

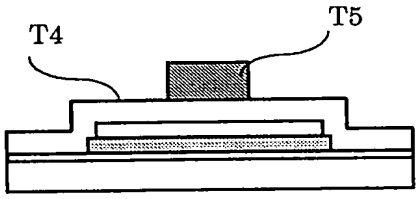


FIG. 18E

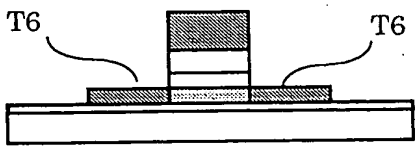


FIG. 18F1

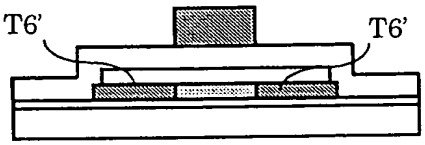


FIG. 18F2

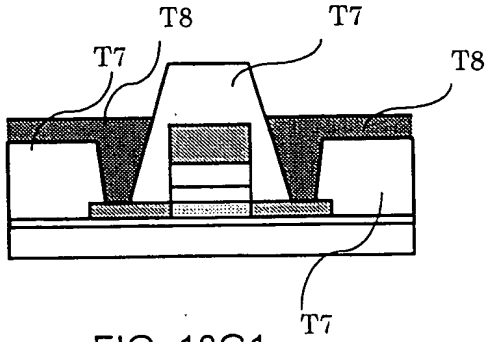


FIG. 18G1

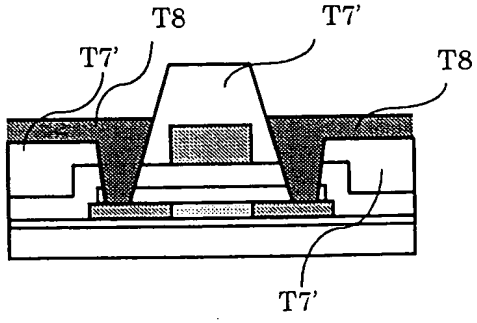


FIG. 18G2

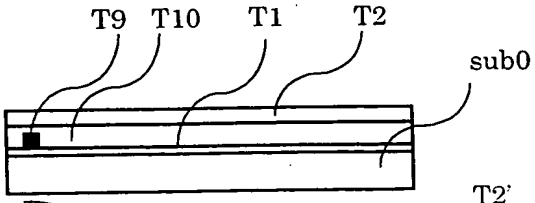


FIG. 19A

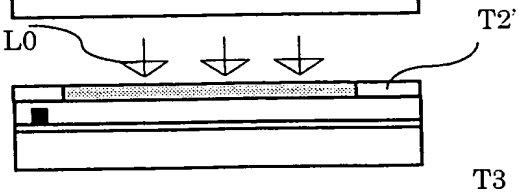


FIG. 19B

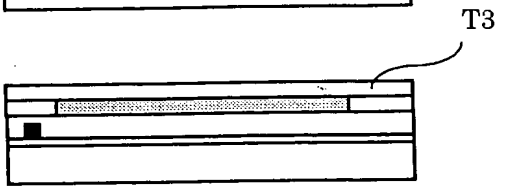


FIG. 19C

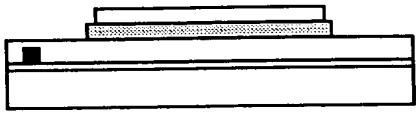


FIG. 19D

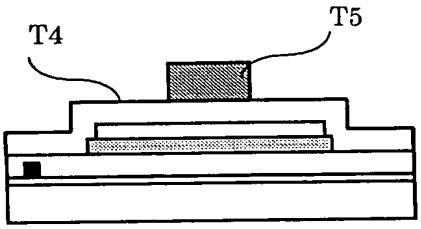


FIG. 19E

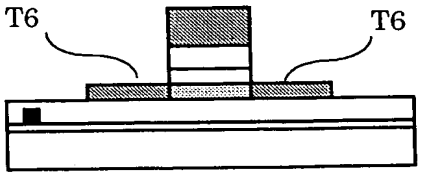


FIG. 19F1

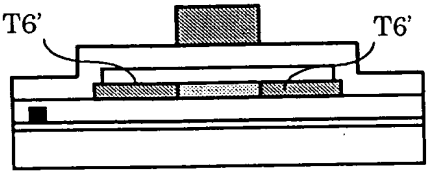


FIG. 19F2

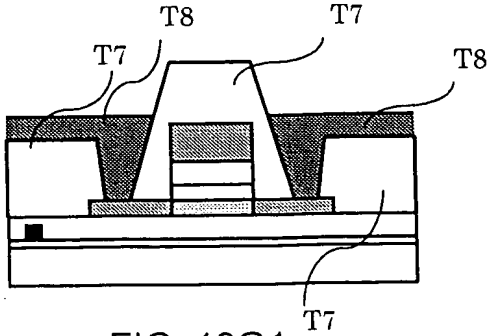


FIG. 19G1

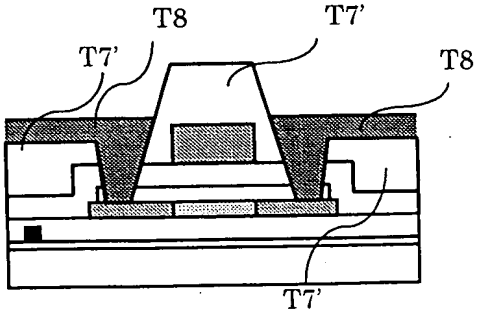


FIG. 19G2

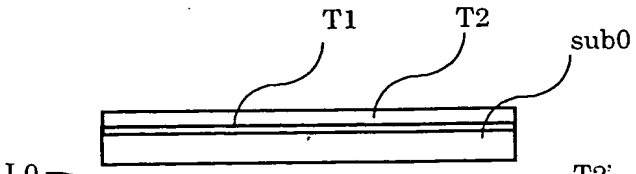


FIG. 20A

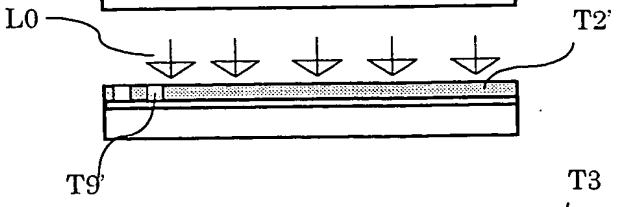


FIG. 20B

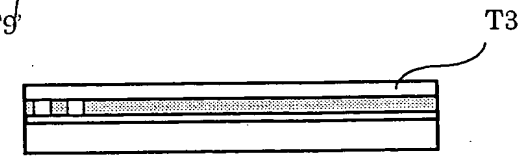


FIG. 20C

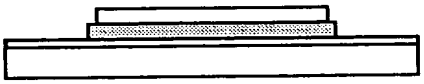


FIG. 20D

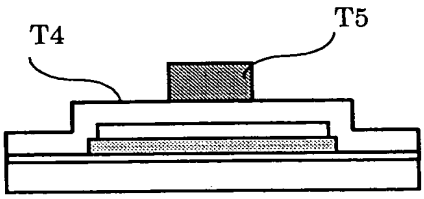


FIG. 20E

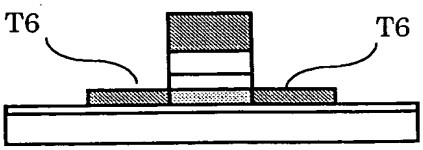


FIG. 20G1

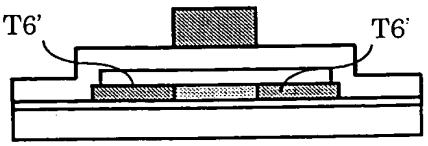


FIG. 20G2

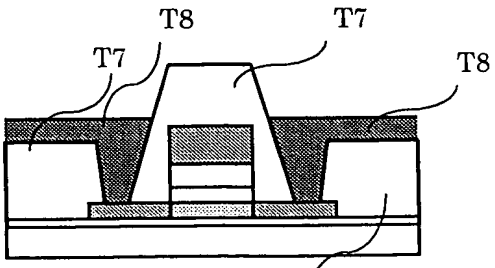


FIG. 20F1

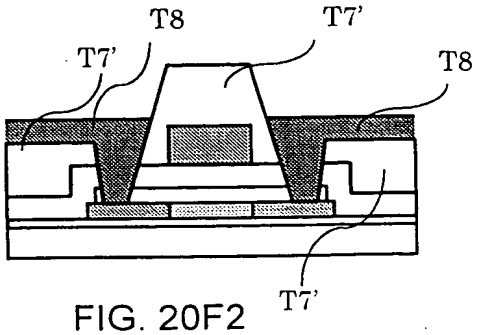


FIG. 20F2

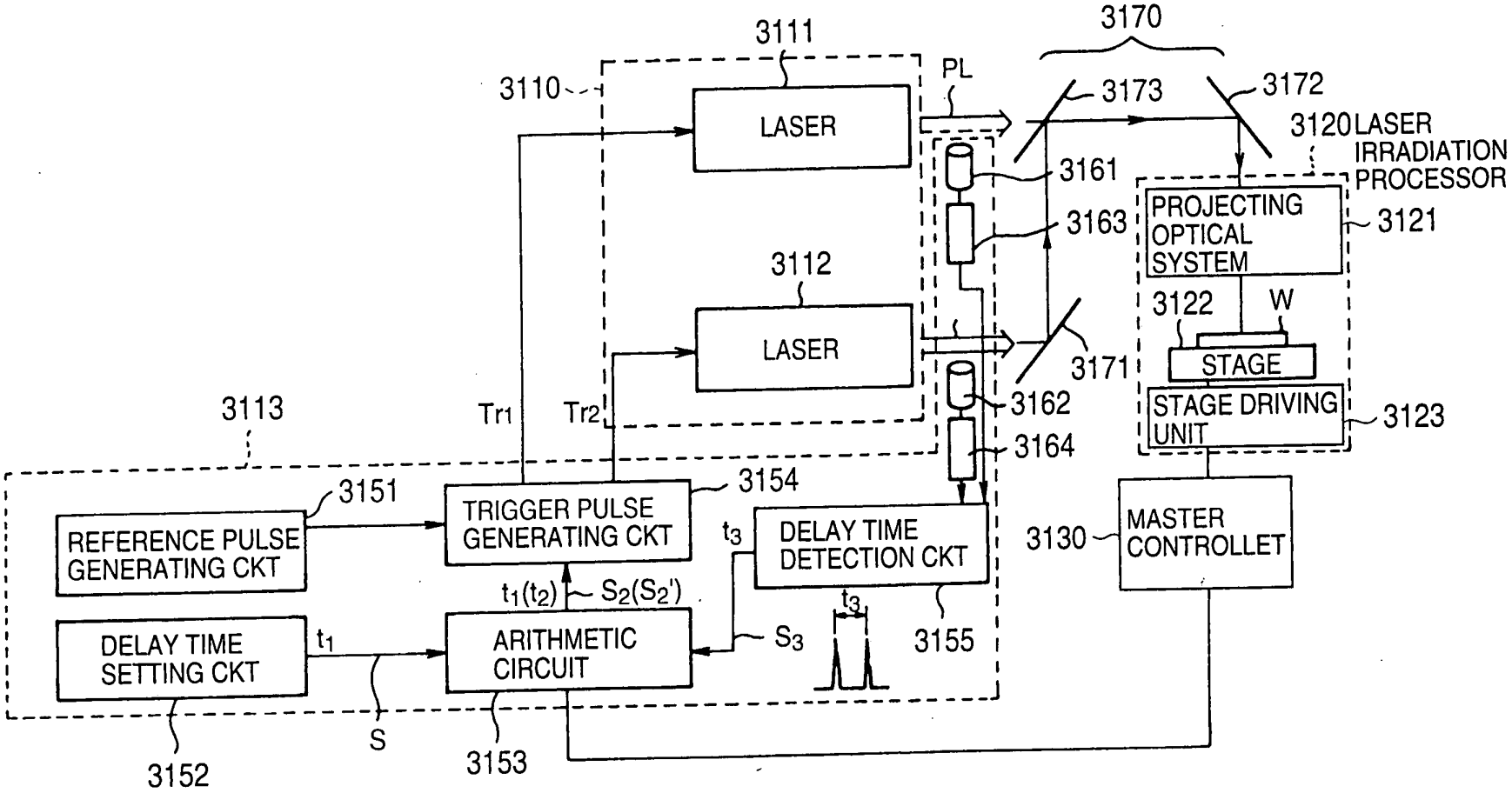

3111
3110
LASER
PL
3170
3173
3172
3120 LASER IRRADIATION PROCESSOR
3161
3163
3112
LASER
PROJECTING OPTICAL SYSTEM
3121
3122
W
STAGE
3171
3162
3164
STAGE DRIVING UNIT
3123
3113
Tr1
Tr2
3151
REFERENCE PULSE GENERATING CKT
TRIGGER PULSE GENERATING CKT
3154
t3
DELAY TIME DETECTION CKT
3130
MASTER CONTROLLET
t1(t2)
S2(S2')
t3
DELAY TIME SETTING CKT
t1
ARITHMETIC CIRCUIT
S3
3155
S
3152
3153

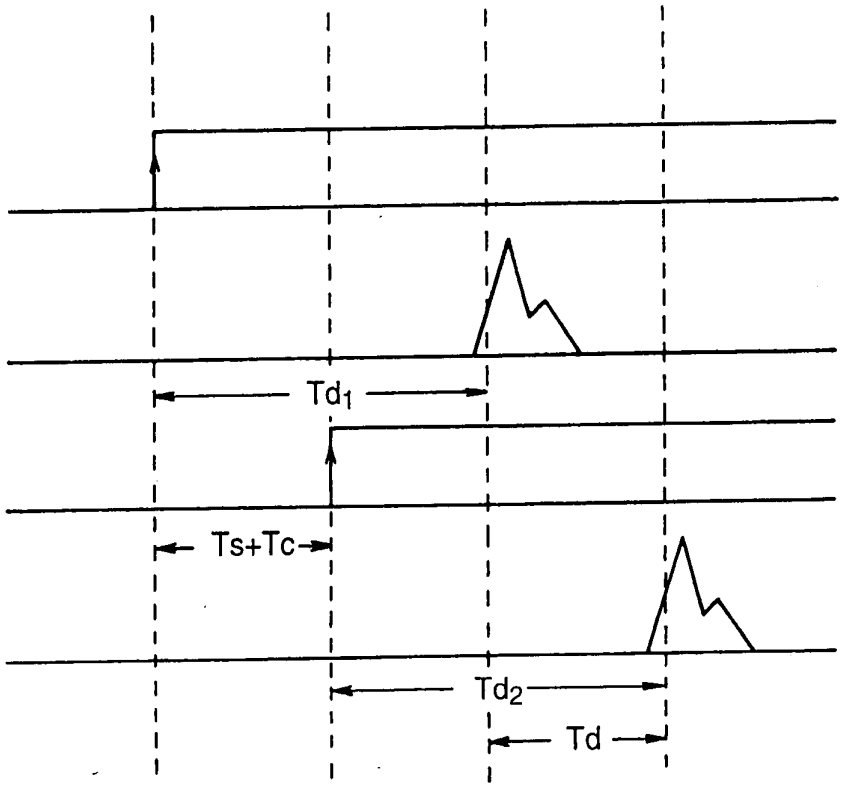
FIG.21

FIG.22A FIRST LASING TRIGGER

FIG.22B FIRST LASING PULSE

FIG.22C TRIGGER DELAY CIRCUIT OUTPUT / SECOND LASING TRIGGER

FIG.22D SECOND LASING PULSE



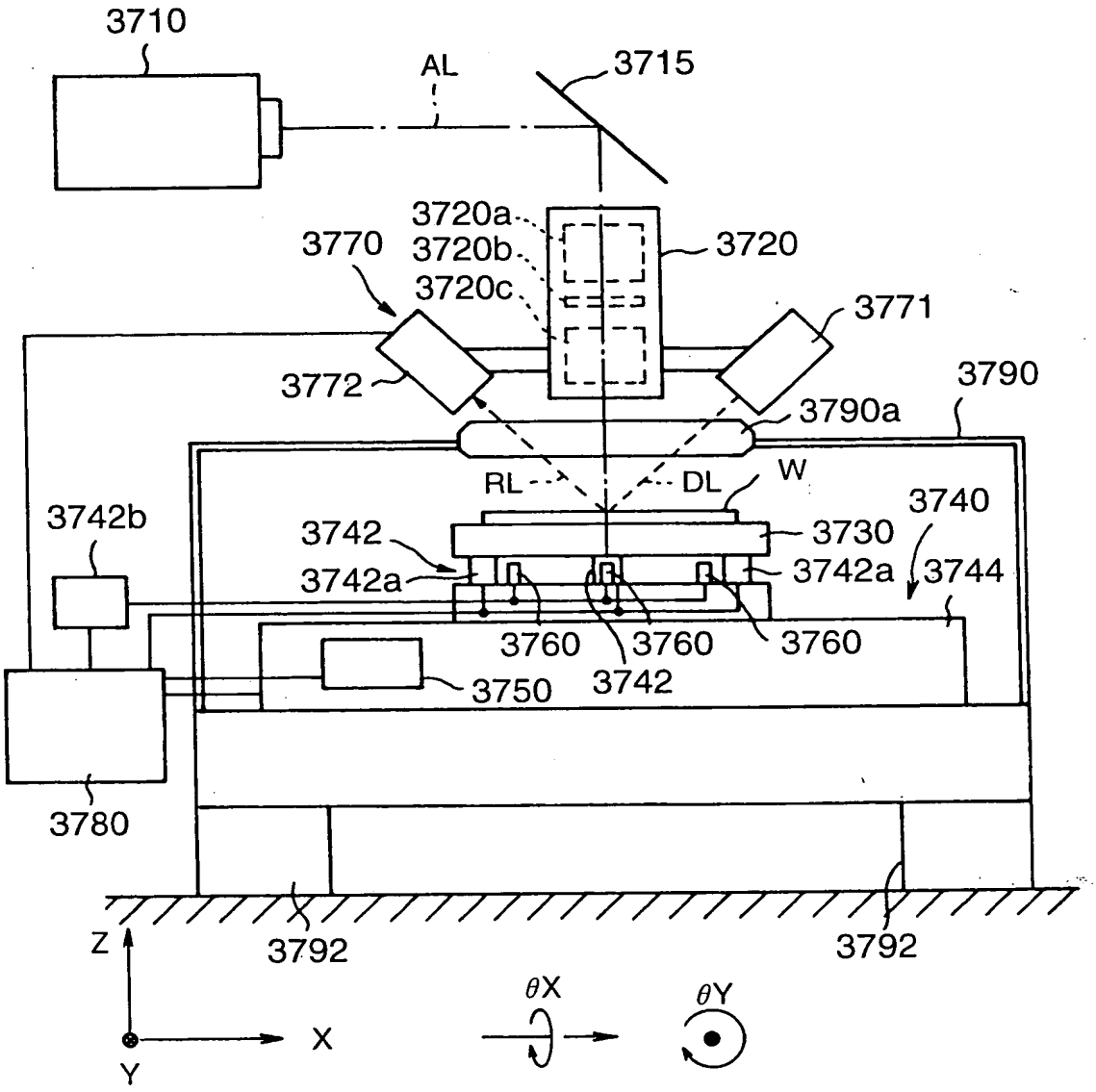

3710
AL
3715
3720a
3720b
3720c
3720
3770
3771
3772
3790
3790a
RL
DL
W
3740
3742b
3742
3730
3742a
3742a
3744
3760
3760
3760
3750
3742
3780
3792
3792
Z
X
Y
θX
θY

FIG.23

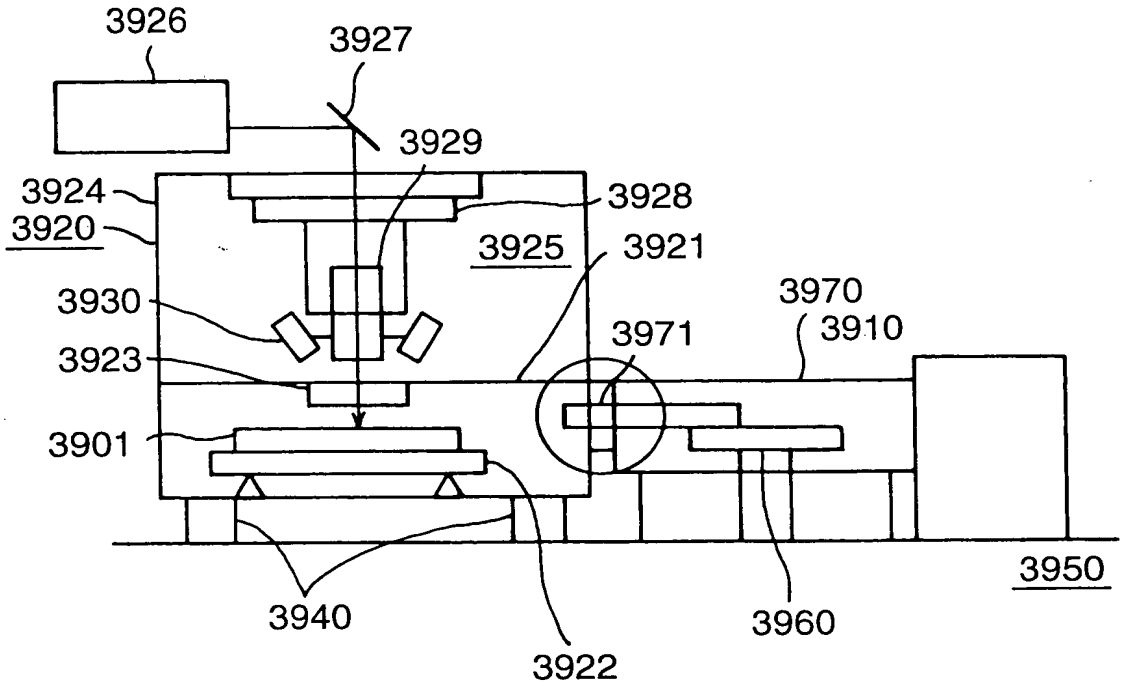

3926
3927
3929
3924
3928
3920
3925
3921
3930
3970
3910
3971
3923
3901
3950
3940
3960
3922

FIG.24

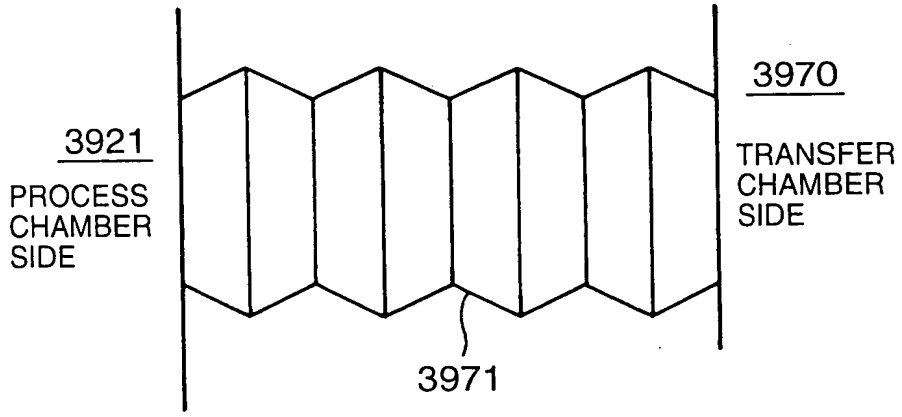

3970
3921
PROCESS CHAMBER SIDE
TRANSFER CHAMBER SIDE
3971

FIG.25

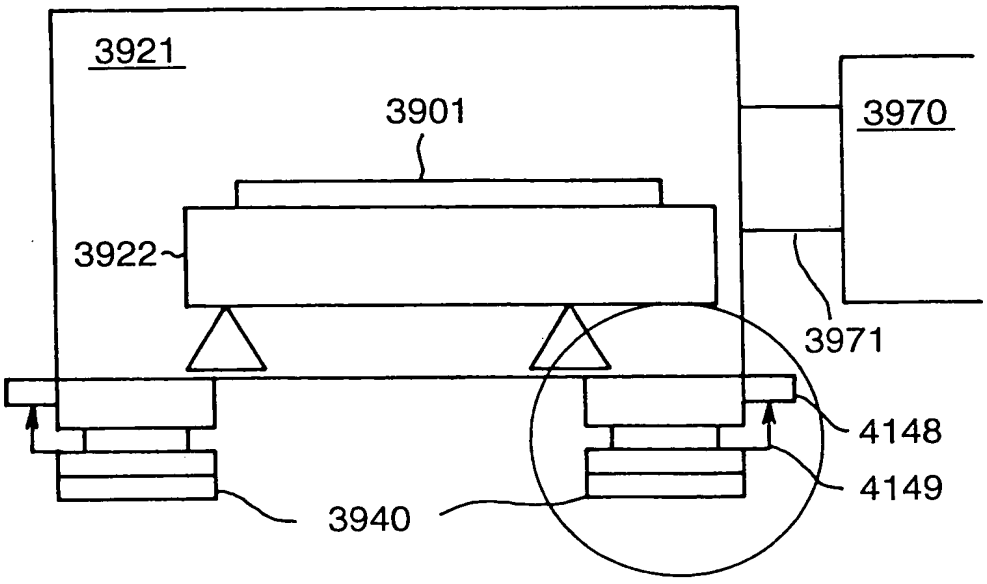

3921
3901
3970
3922
3971
4148
4149
3940

FIG.26

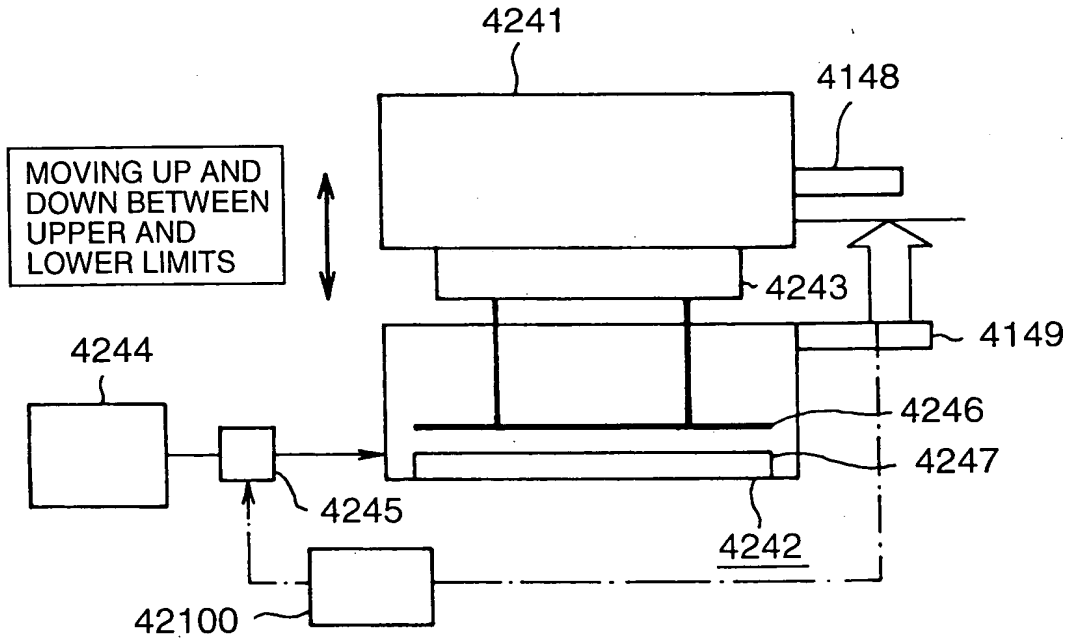

4241
4148
MOVING UP AND DOWN BETWEEN UPPER AND LOWER LIMITS
4243
4149
4244
4246
4247
4245
4242
42100

FIG.27

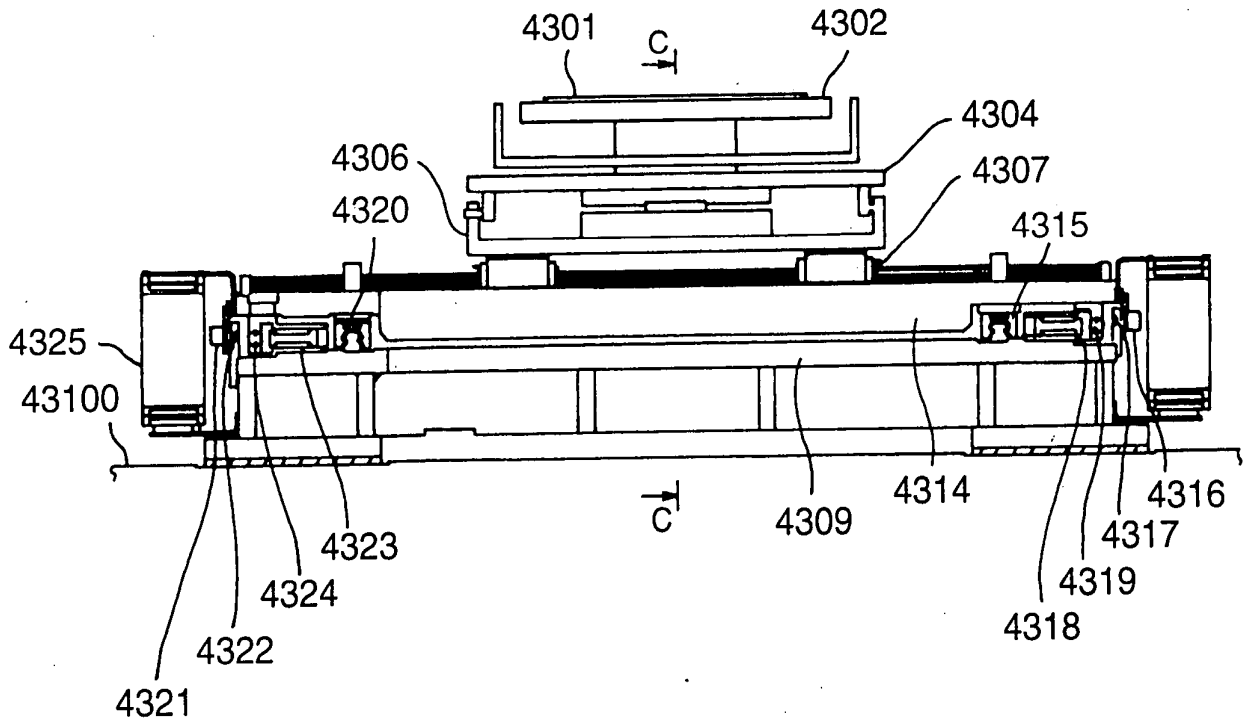
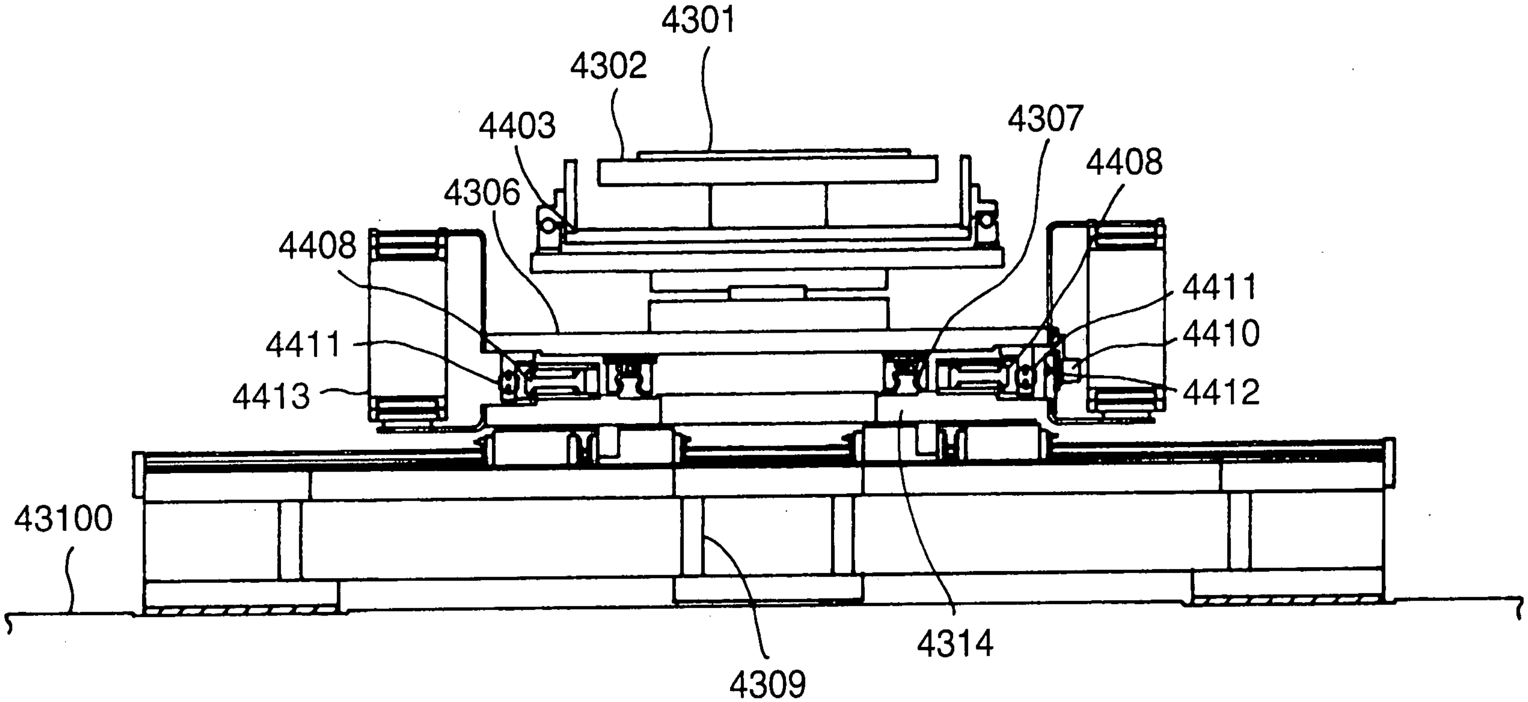

4301
C
4302
4304
4306
4307
4320
4315
4325
43100
C
4309
4314
4316
4323
4317
4324
4319
4322
4318
4321

FIG.28


4301
4302
4403
4306
4307
4408
4408
4411
4413
4411
4410
4412
43100
4309
4314

C-C

FIG.29

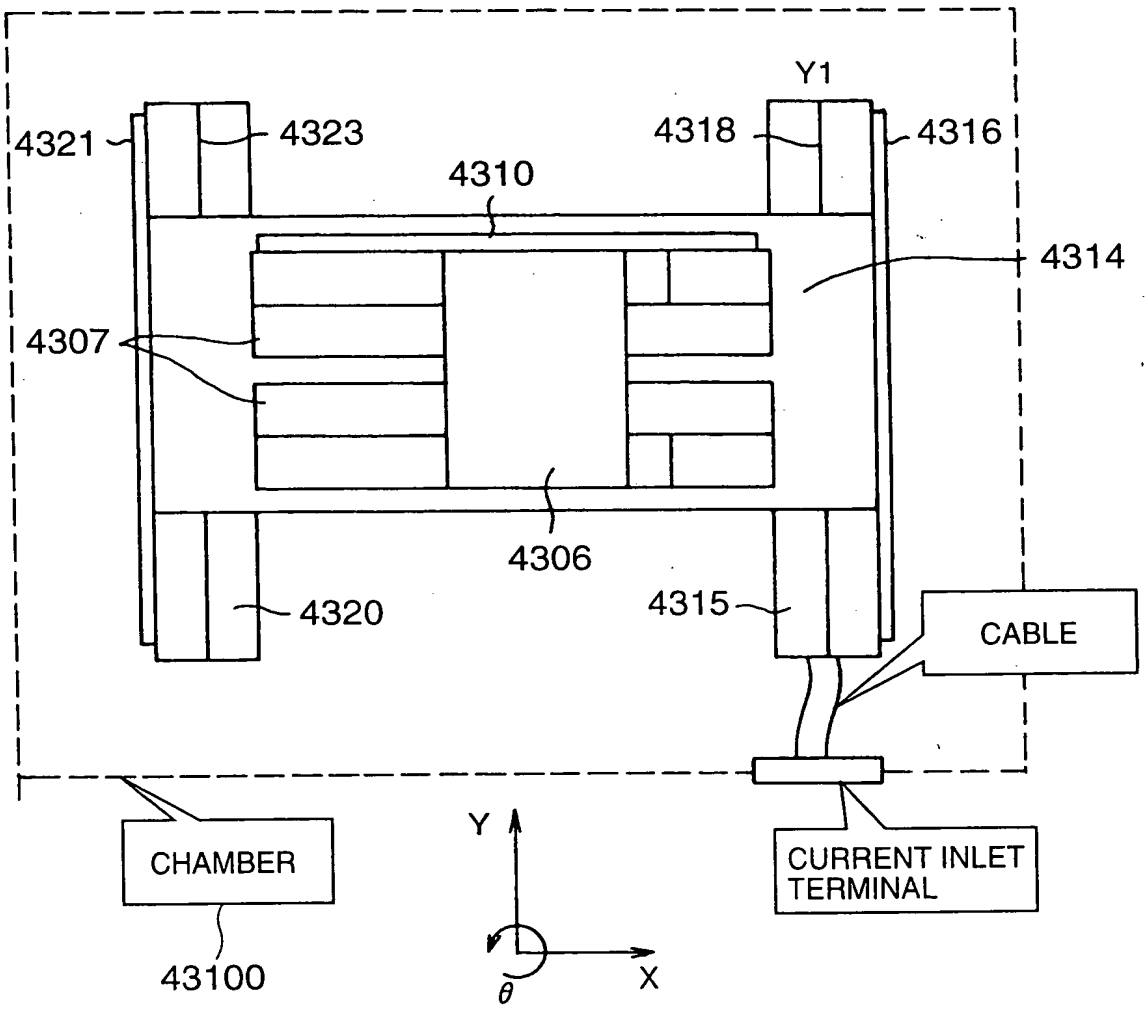

Y1
4321
4323
4318
4316
4310
4314
4307
4306
4320
4315
CABLE
CHAMBER
43100
Y
X
θ
CURRENT INLET TERMINAL

FIG.30

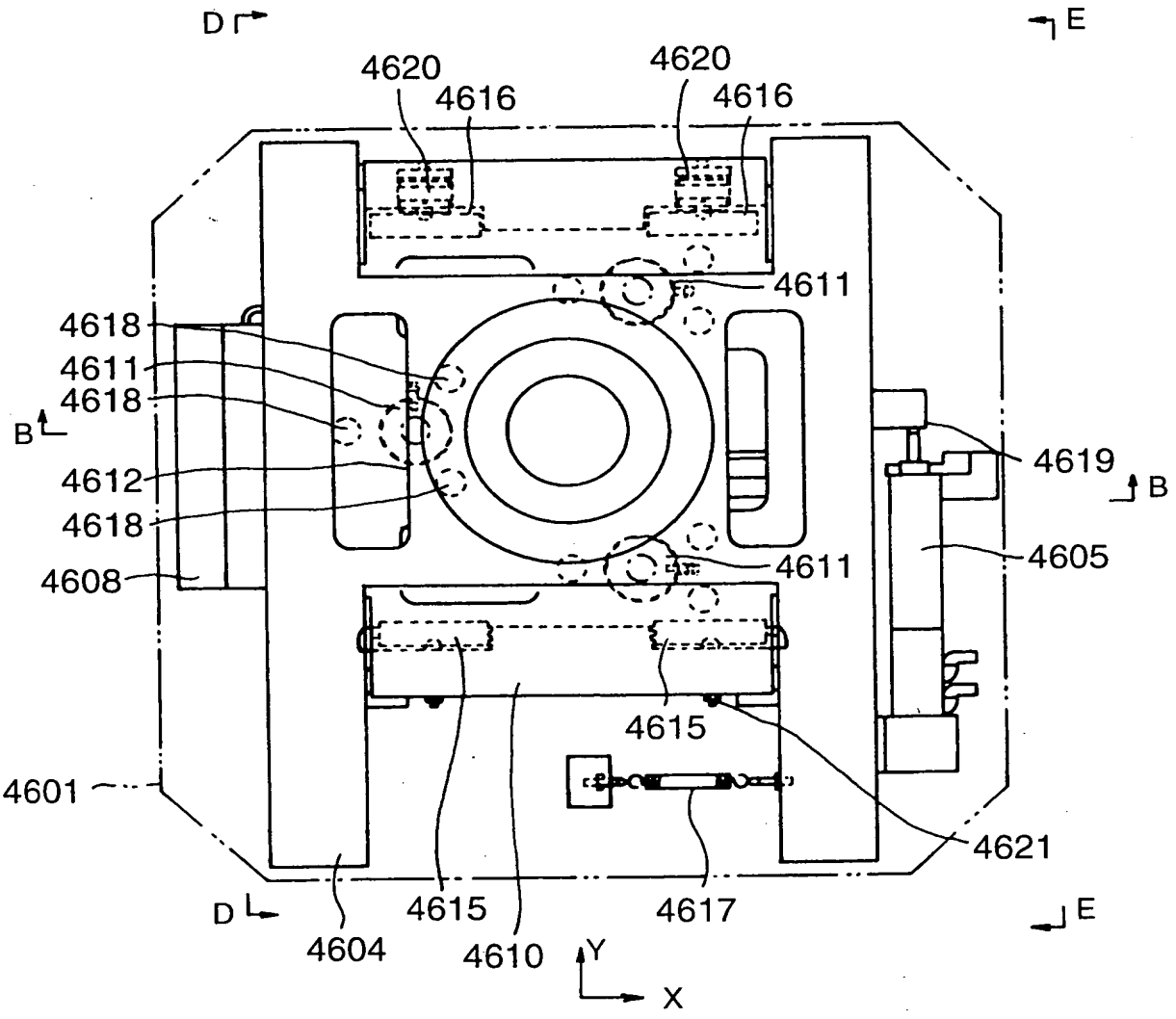

D
E
4620
4616
4620
4616
4611
4618
4611
4618
B
4612
4618
4608
4619
B
4605
4611
4615
4601
4621
D
4615
4617
E
4604
4610
Y
X

FIG.31

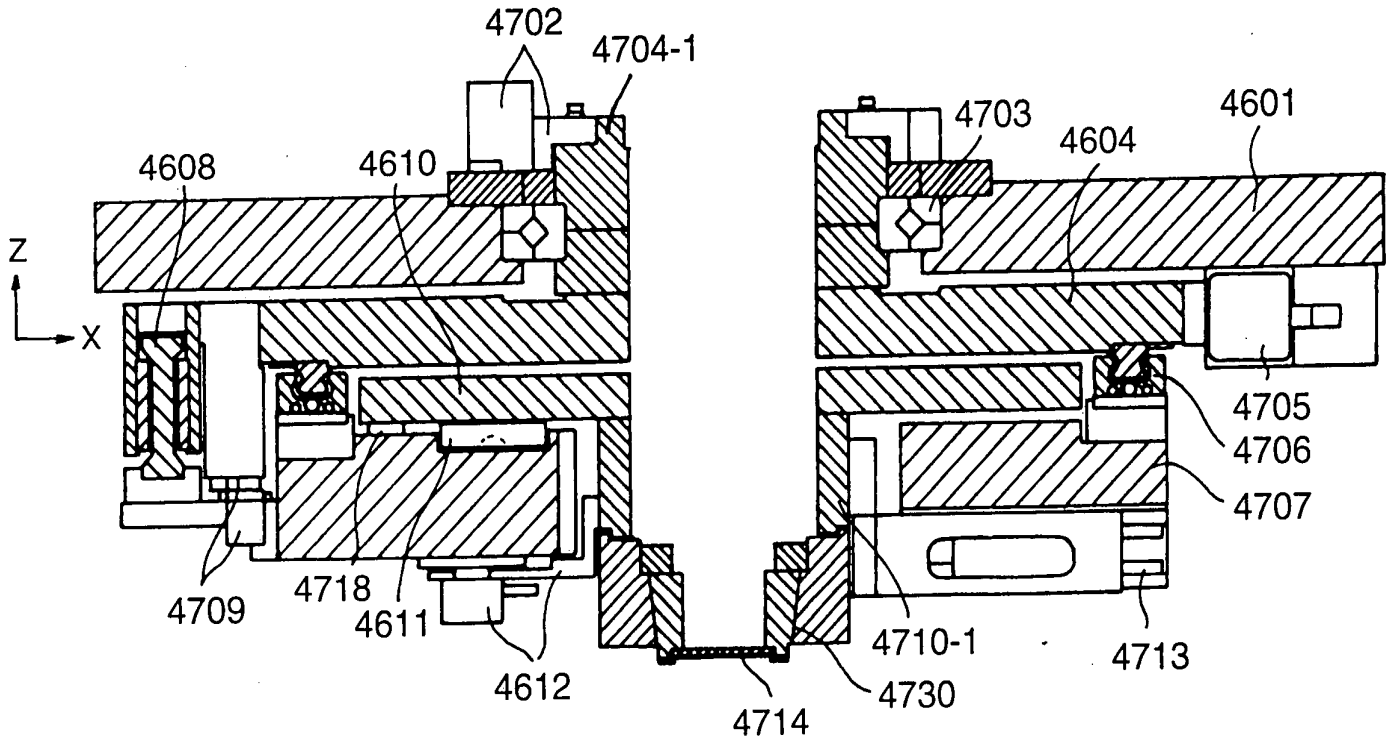


FIG.32

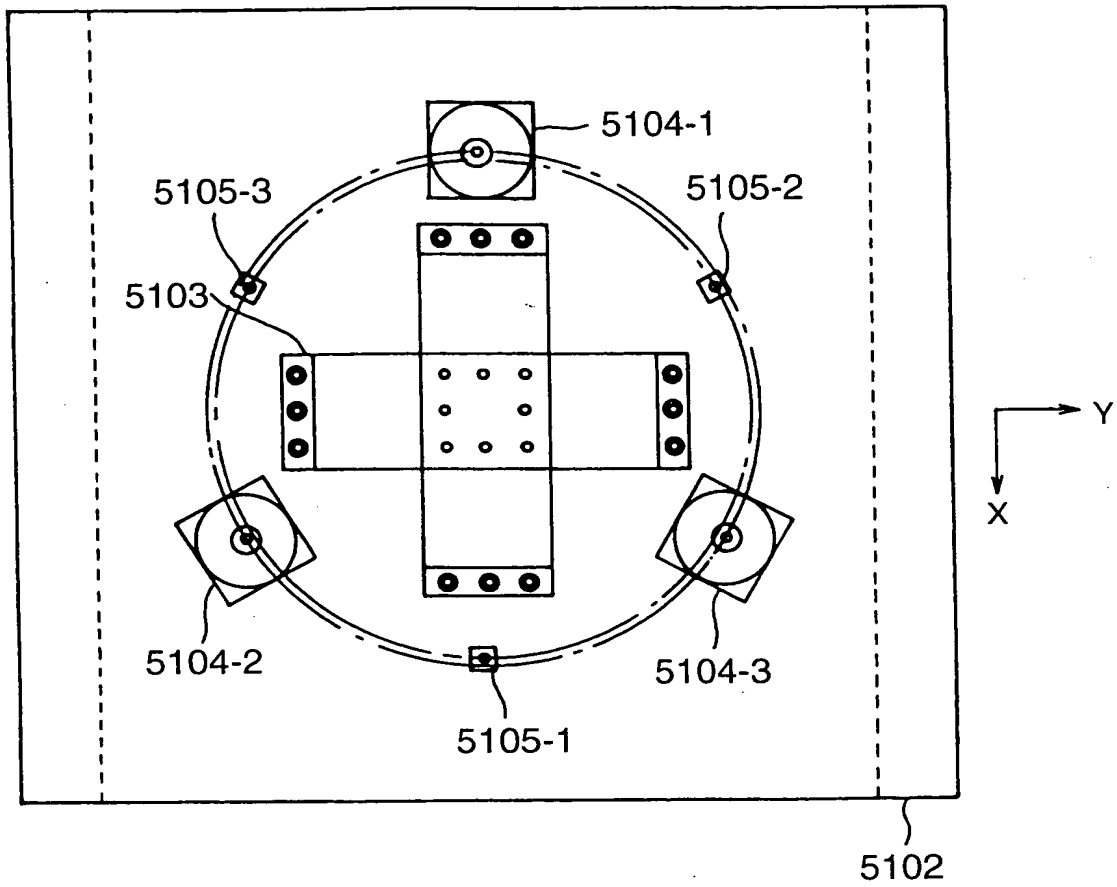

5104-1
5105-3
5105-2
5103
Y
X
5104-2
5104-3
5105-1
5102

FIG.33

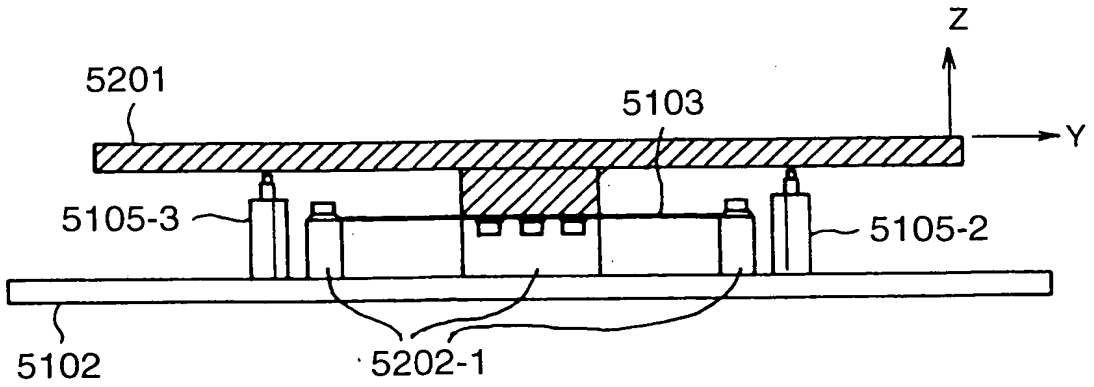

Z
5201
5103
Y
5105-3
5105-2
5102
5202-1

FIG.34

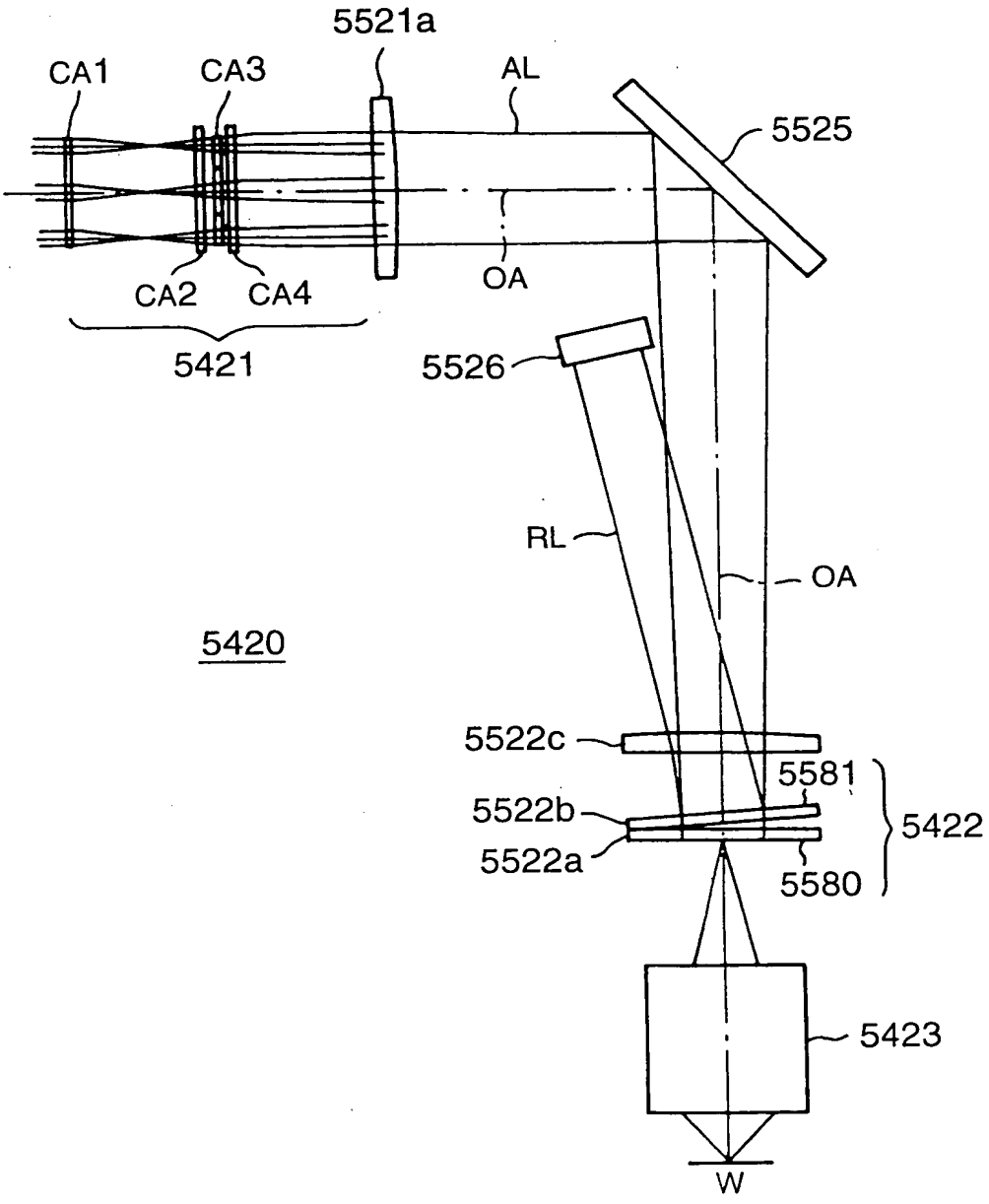

5521a
CA1
CA3
AL
5525
CA2
CA4
OA
5421
5526
RL
OA
5420
5522c
5581
5522b
5422
5522a
5580
5423
W

FIG.35

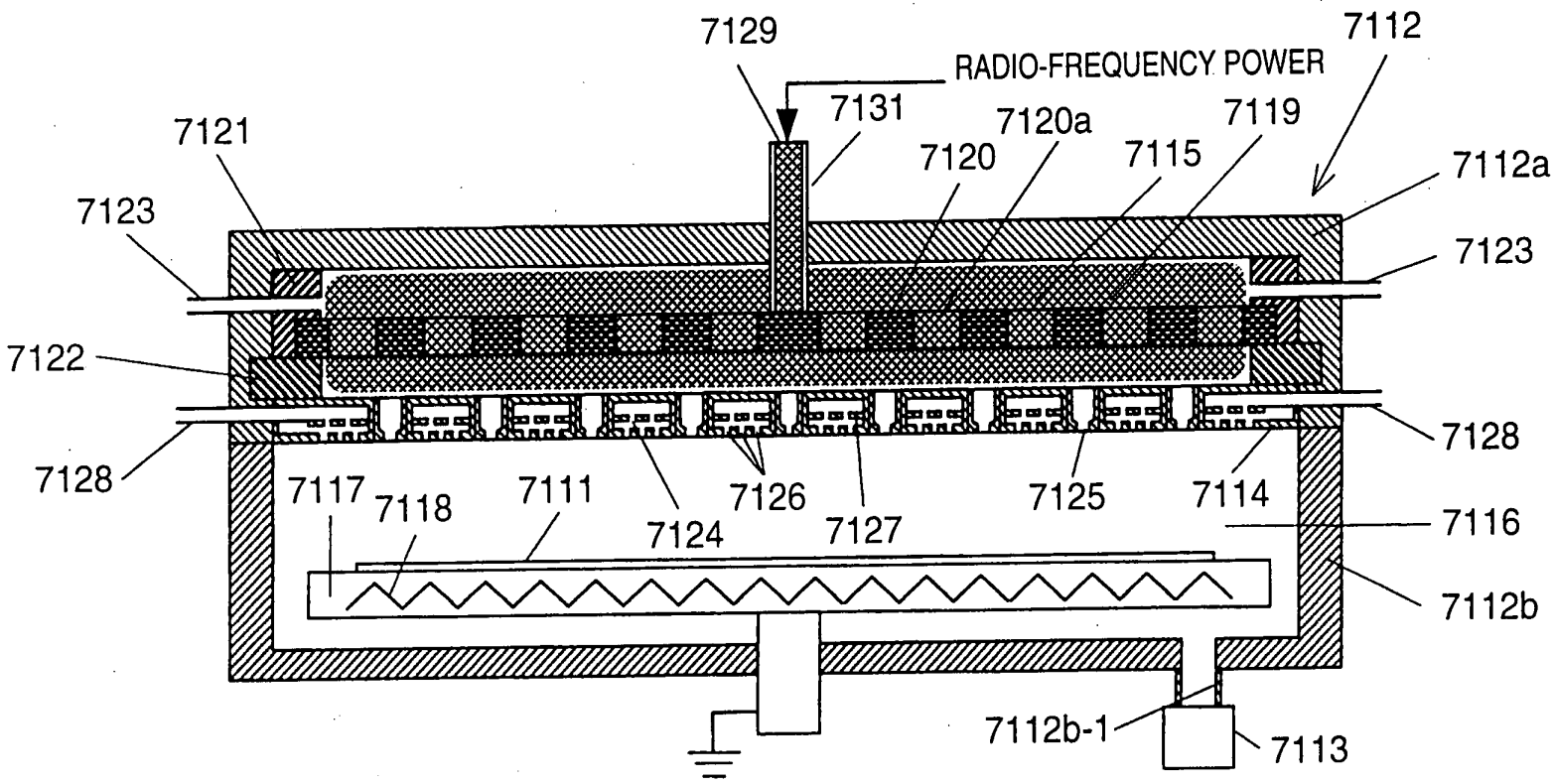

7129
RADIO-FREQUENCY POWER
7112
7131
7120a
7119
7121
7120
7115
7112a
7123
7123
7122
7128
7128
7117
7118
7111
7126
7124
7127
7125
7114
7116
7112b
7112b-1
7113

FIG.36

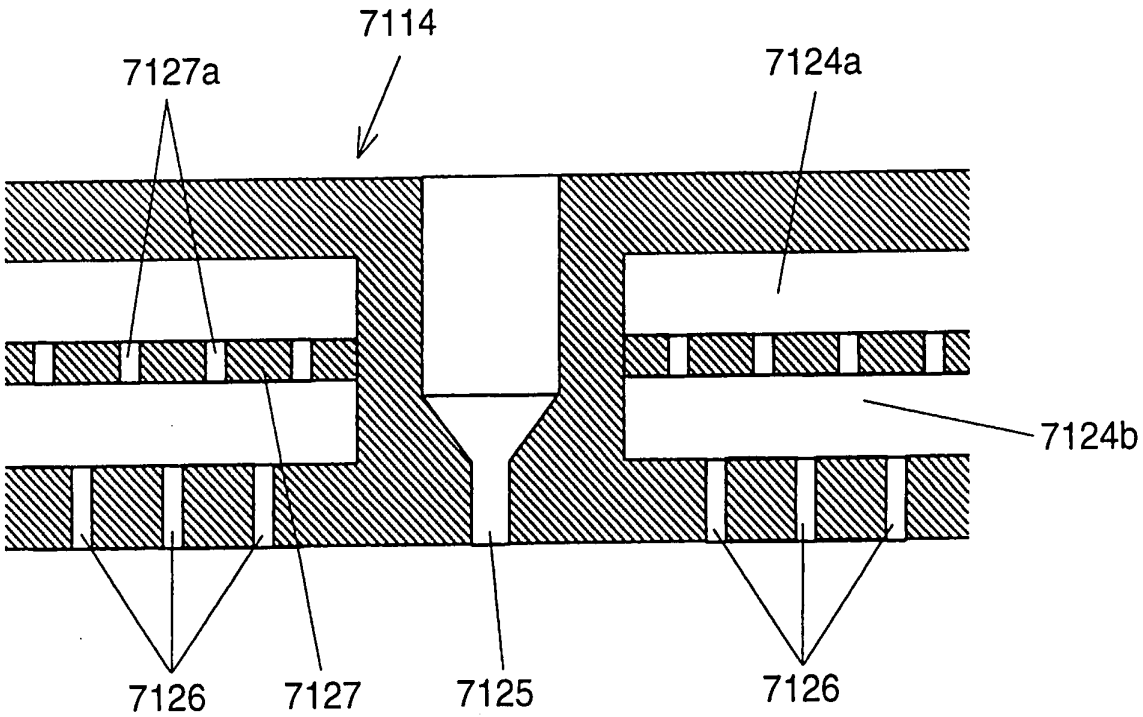


FIG.37

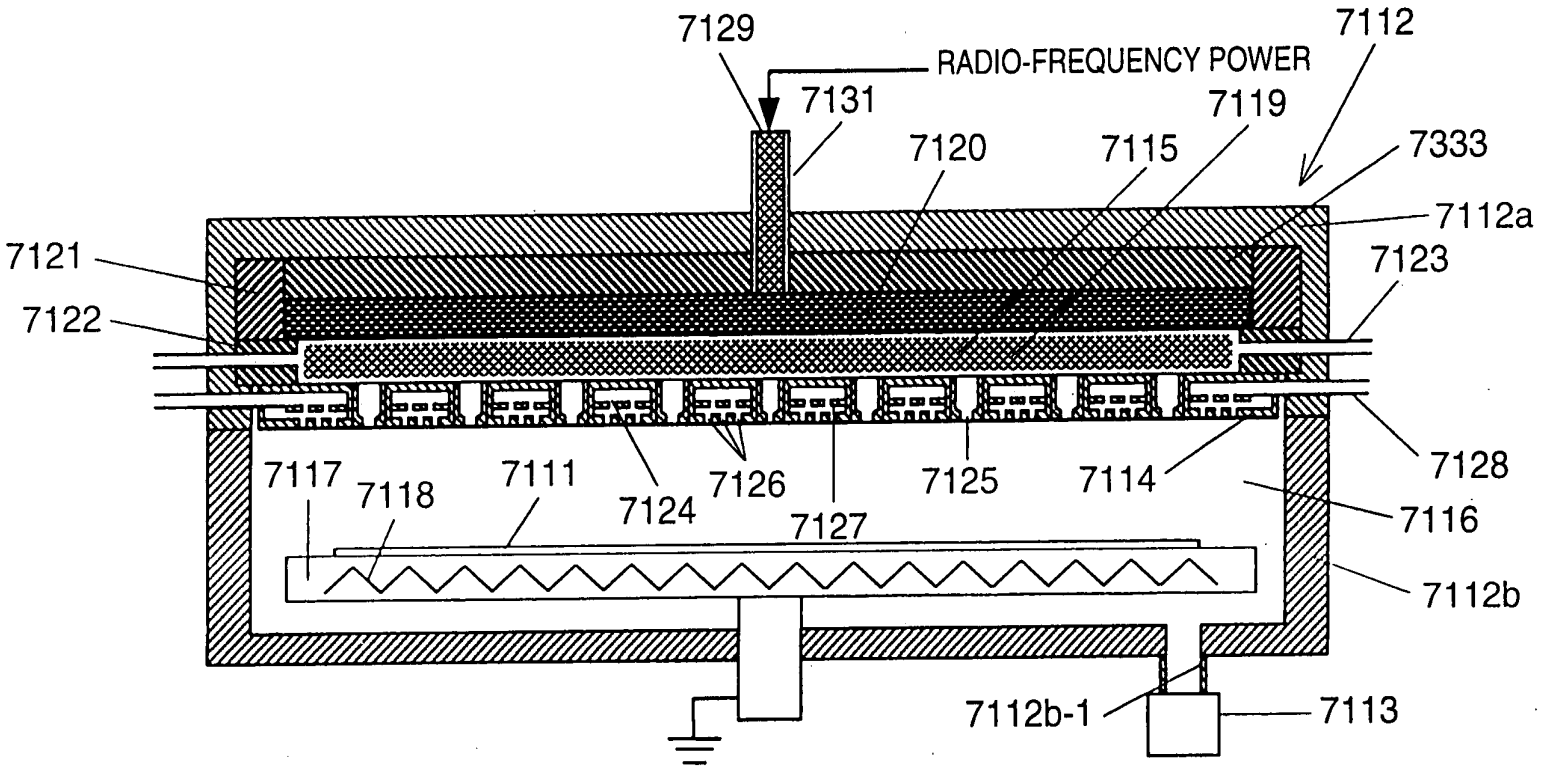


FIG.38

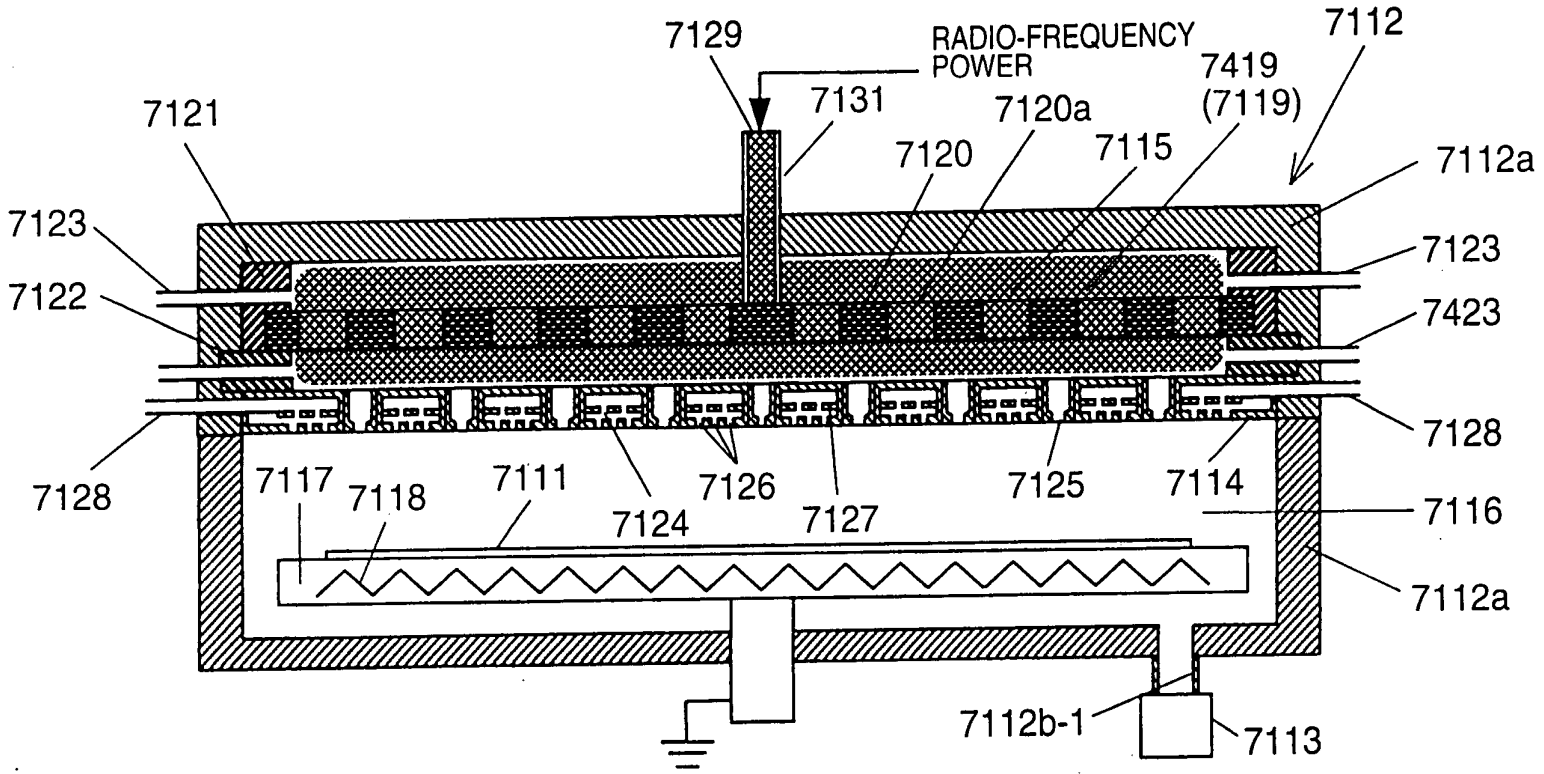


FIG.39

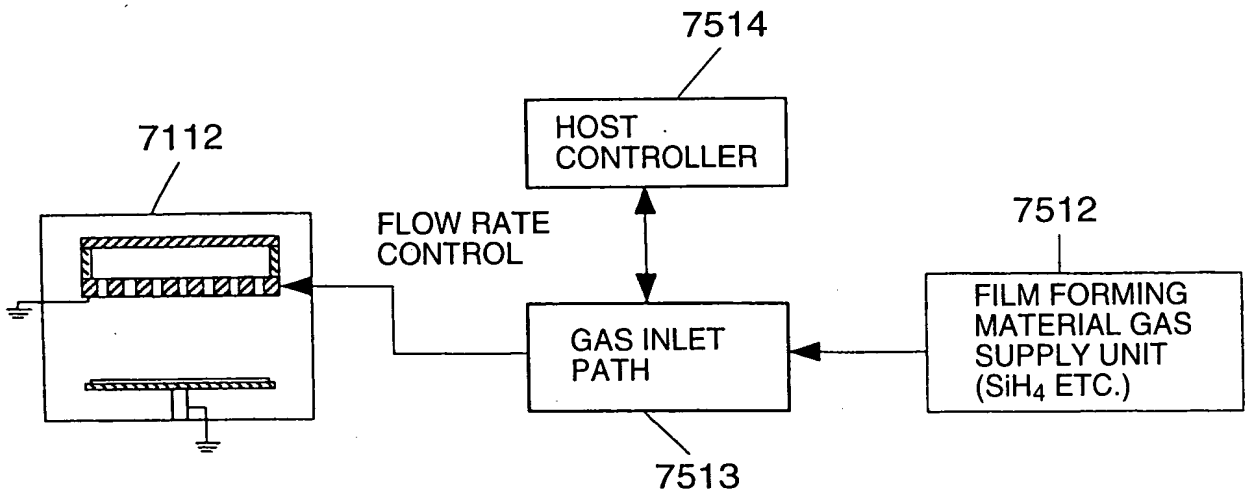


FIG.40

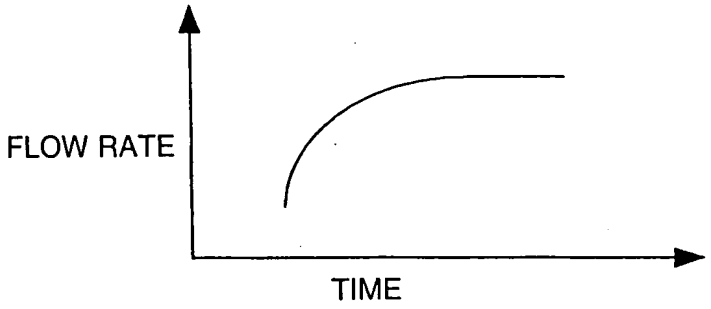
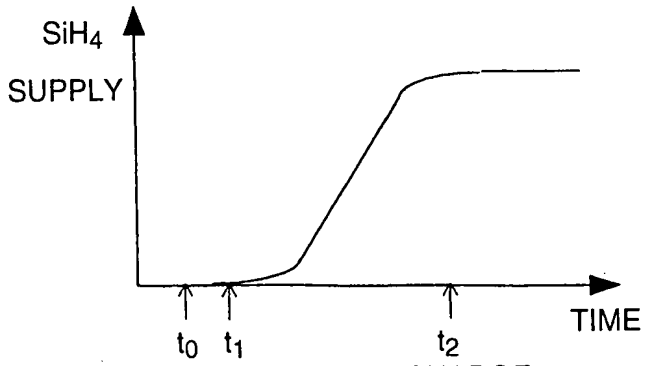


FIG.41



t_0 : START OF O_2 DISCHARGE
t_1 : START OF SiH_4 SUPPLY
t_2 : SiH_4 SUPPLY ATTAINS A CONSTANT LEVEL

FIG.42

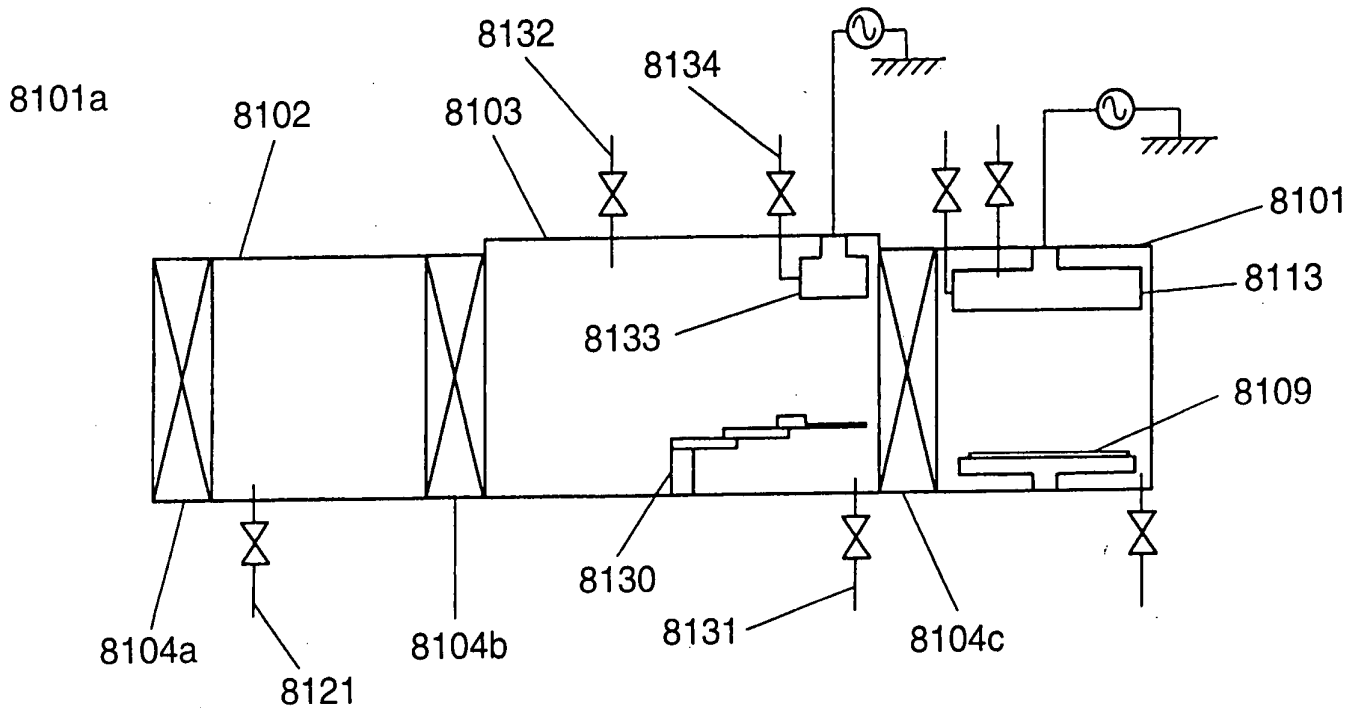


FIG.43

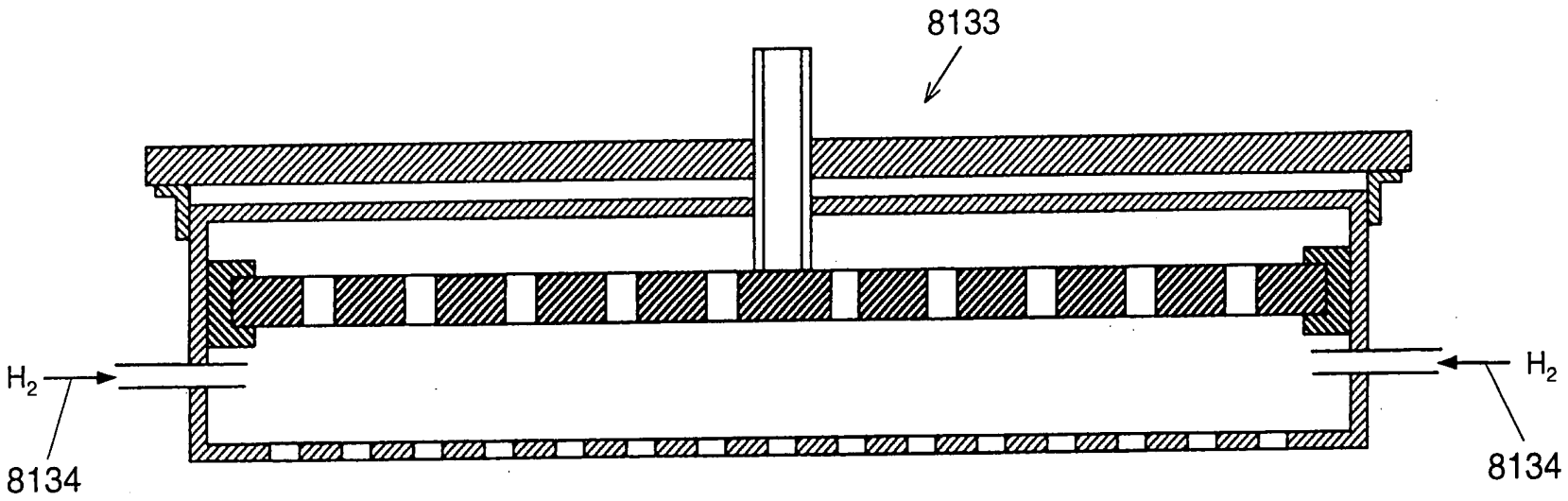


FIG.44

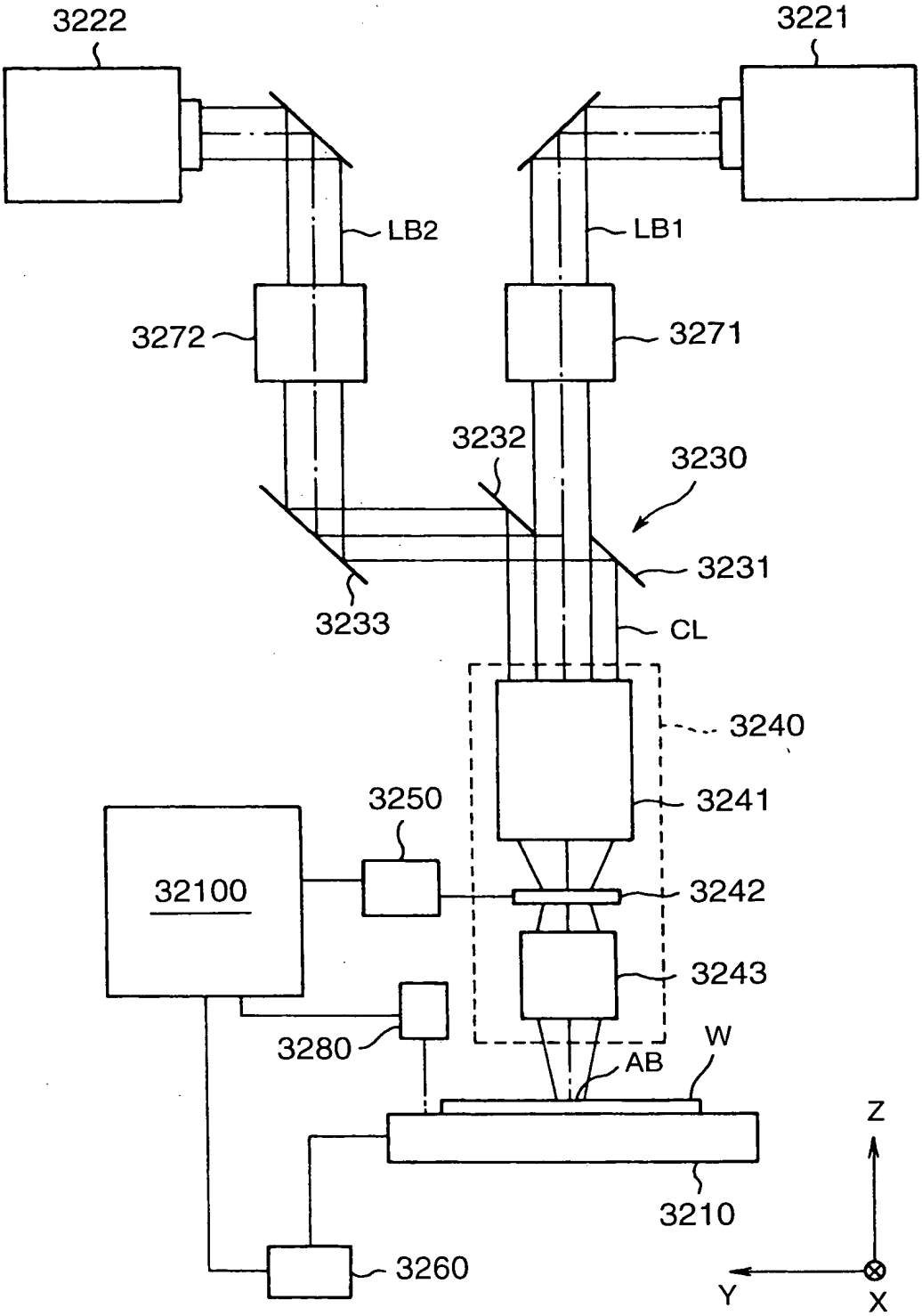

3222
3221
LB2
LB1
3272
3271
3232
3230
3231
3233
CL
3240
3241
3250
32100
3242
3243
3280
W
AB
3210
3260
Z
Y
X

FIG.45

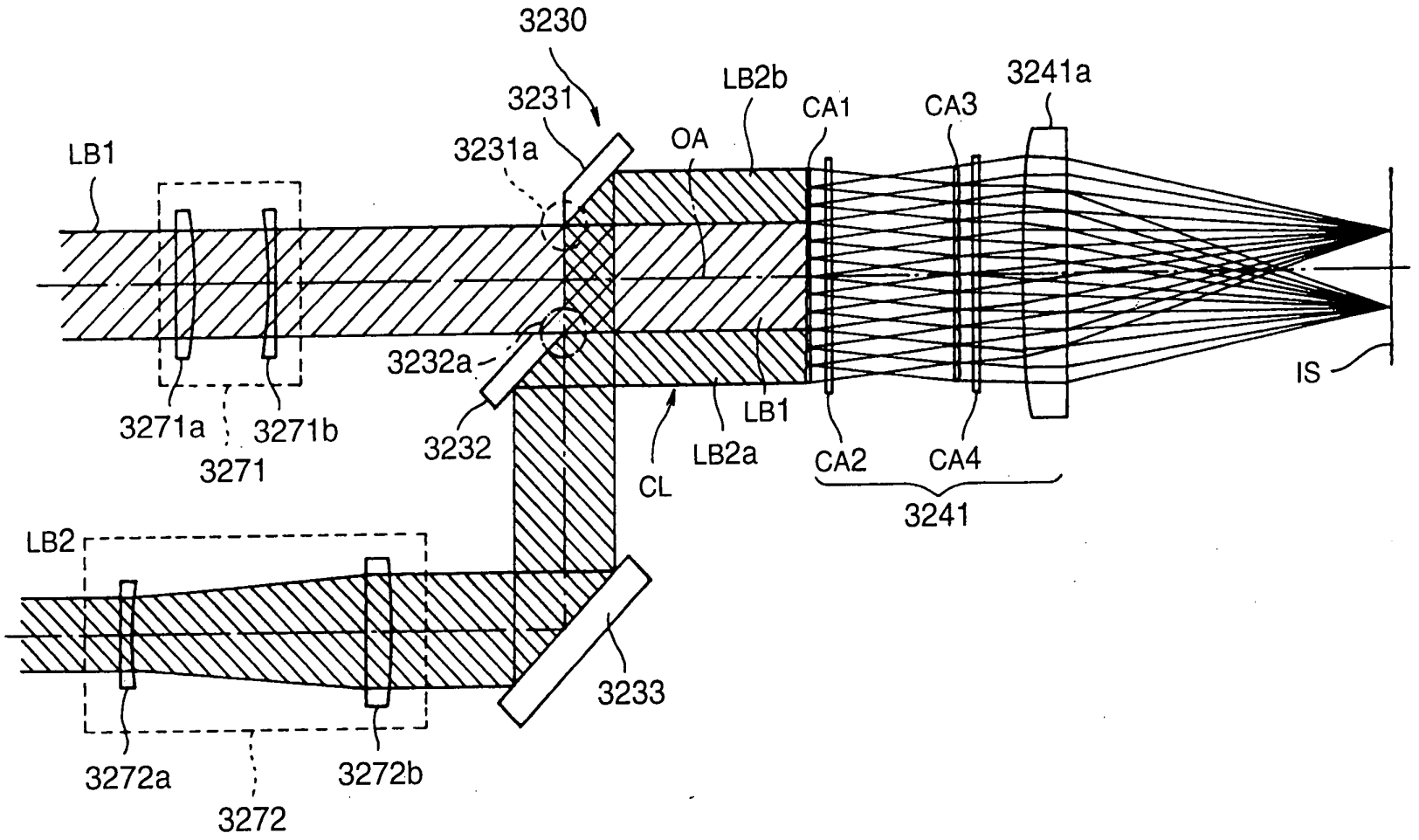

3230
3231
3231a
LB2b
CA1
CA3
3241a
OA
LB1
3232a
IS
3271a
3271b
3271
3232
CL
LB2a
LB1
CA2
CA4
3241
LB2
3233
3272a
3272b
3272

FIG.46

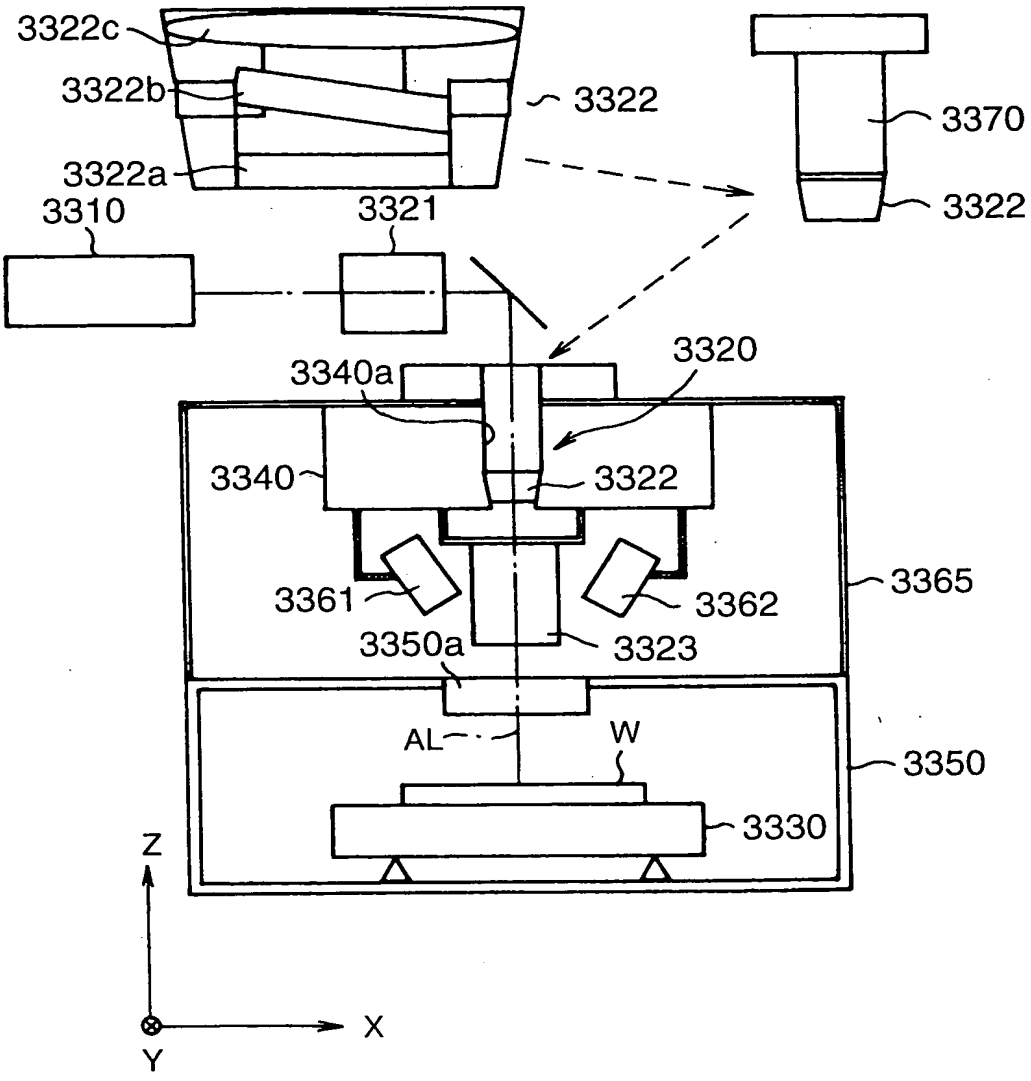

3322c
3322b
3322a
3322
3370
3322
3310
3321
3320
3340a
3340
3322
3361
3362
3365
3350a
3323
AL
W
3350
3330
Z
X
Y

FIG.47

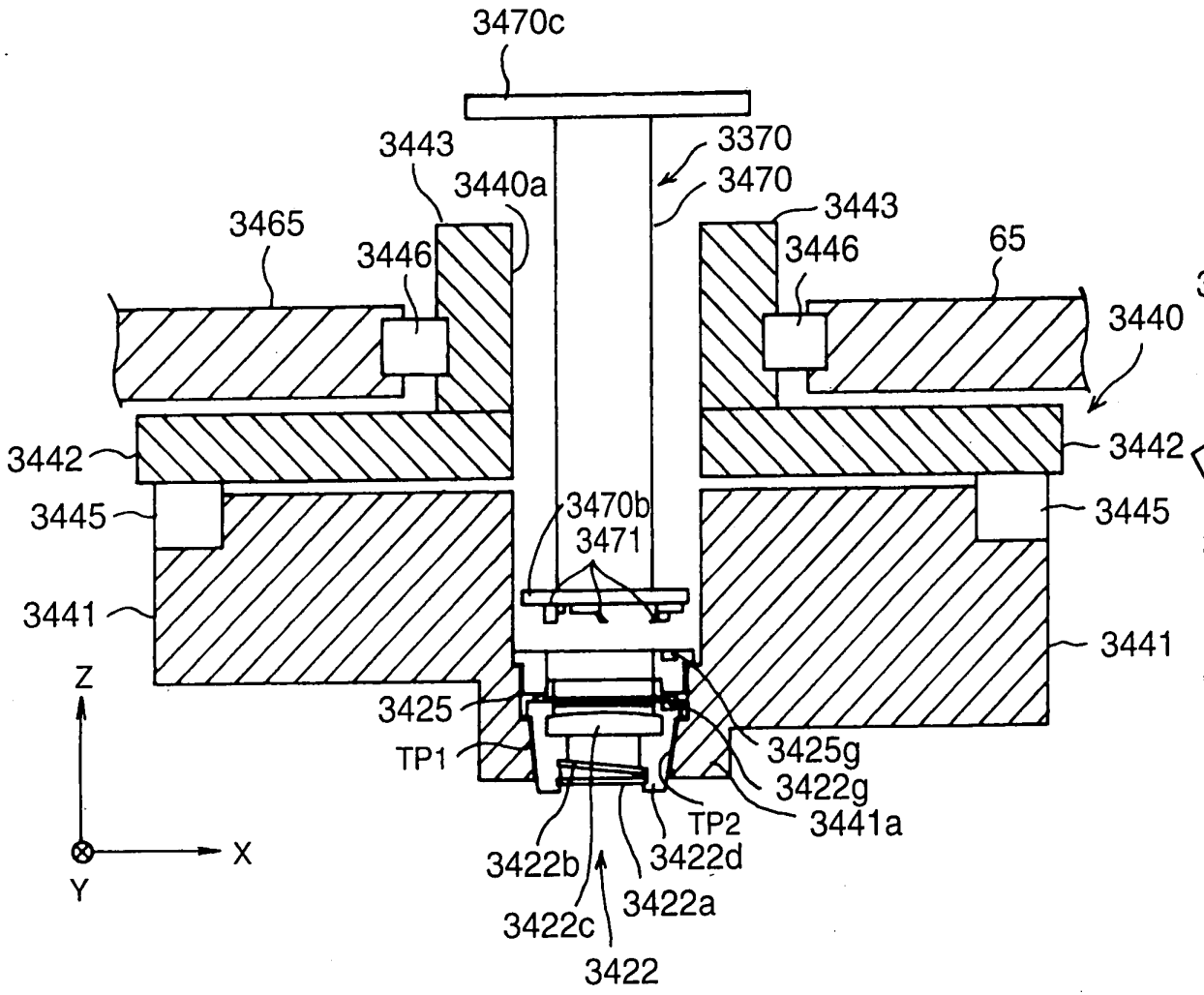


FIG.48A

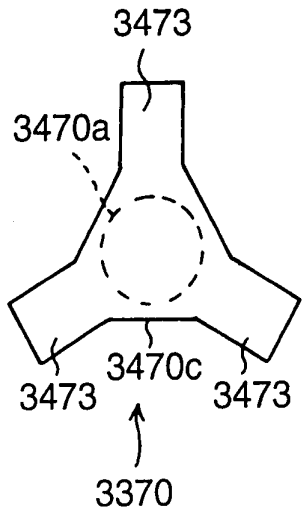


FIG.48B

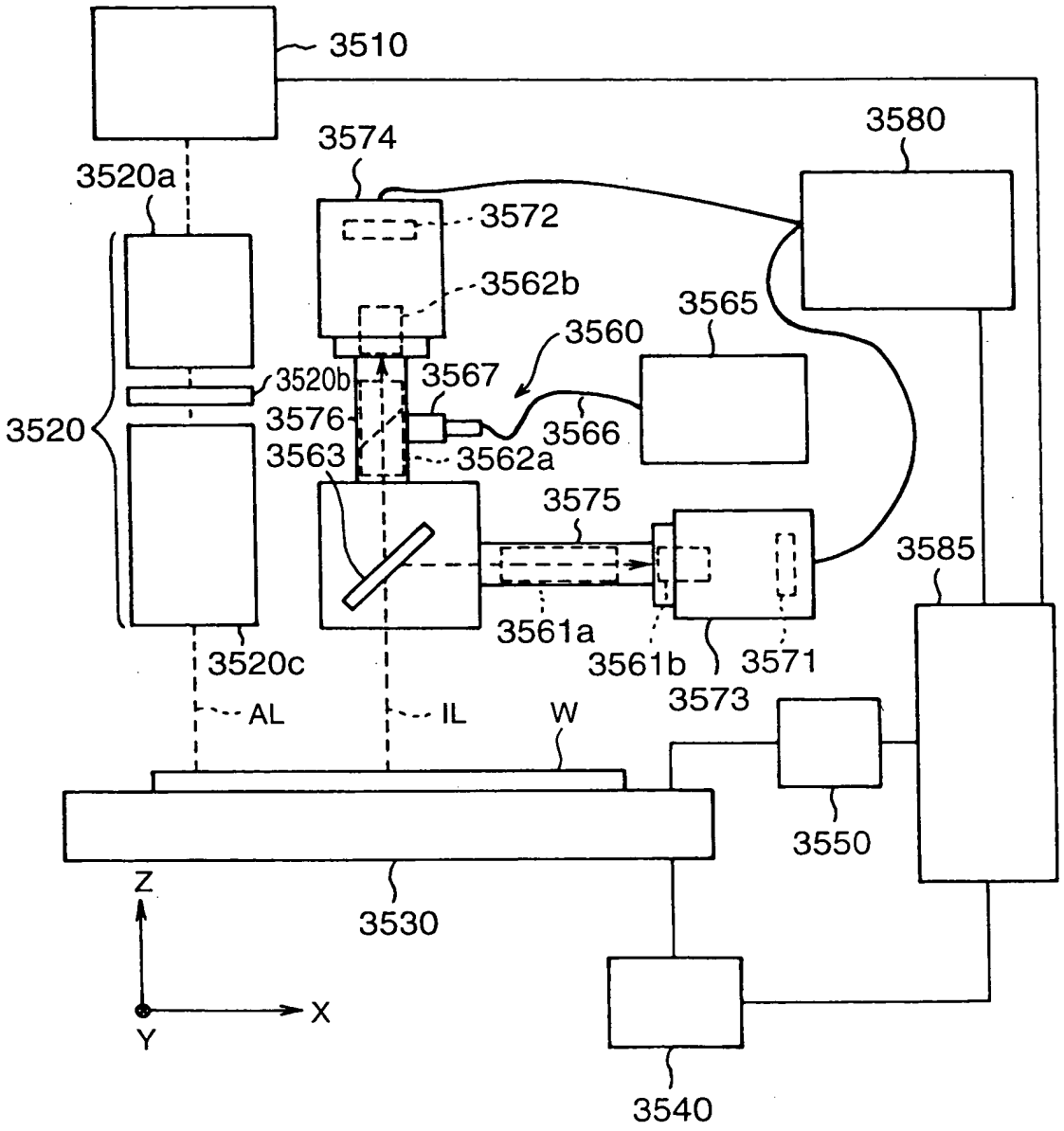

3510
3580
3574
3520a
3572
3562b
3565
3560
3520b
3567
3520
3576
3566
3563
3562a
3575
3585
3561a
3561b
3571
3520c
3573
AL
IL
W
3550
3530
Z
X
Y
3540

FIG.49

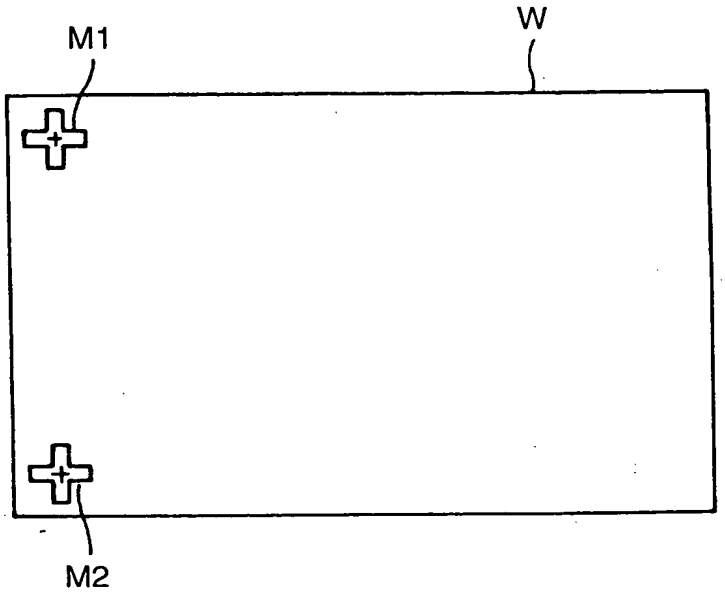


FIG.50

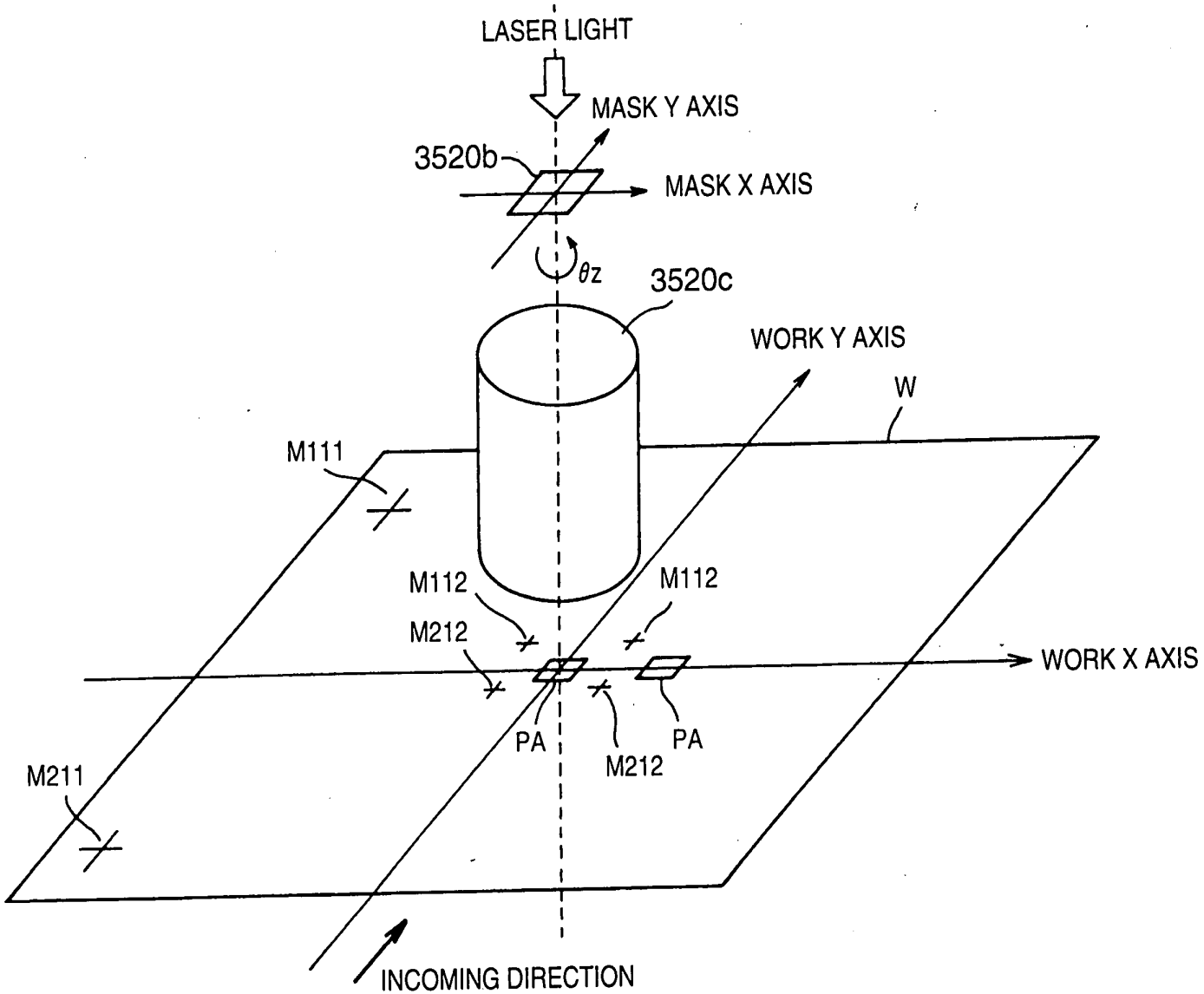


FIG.51

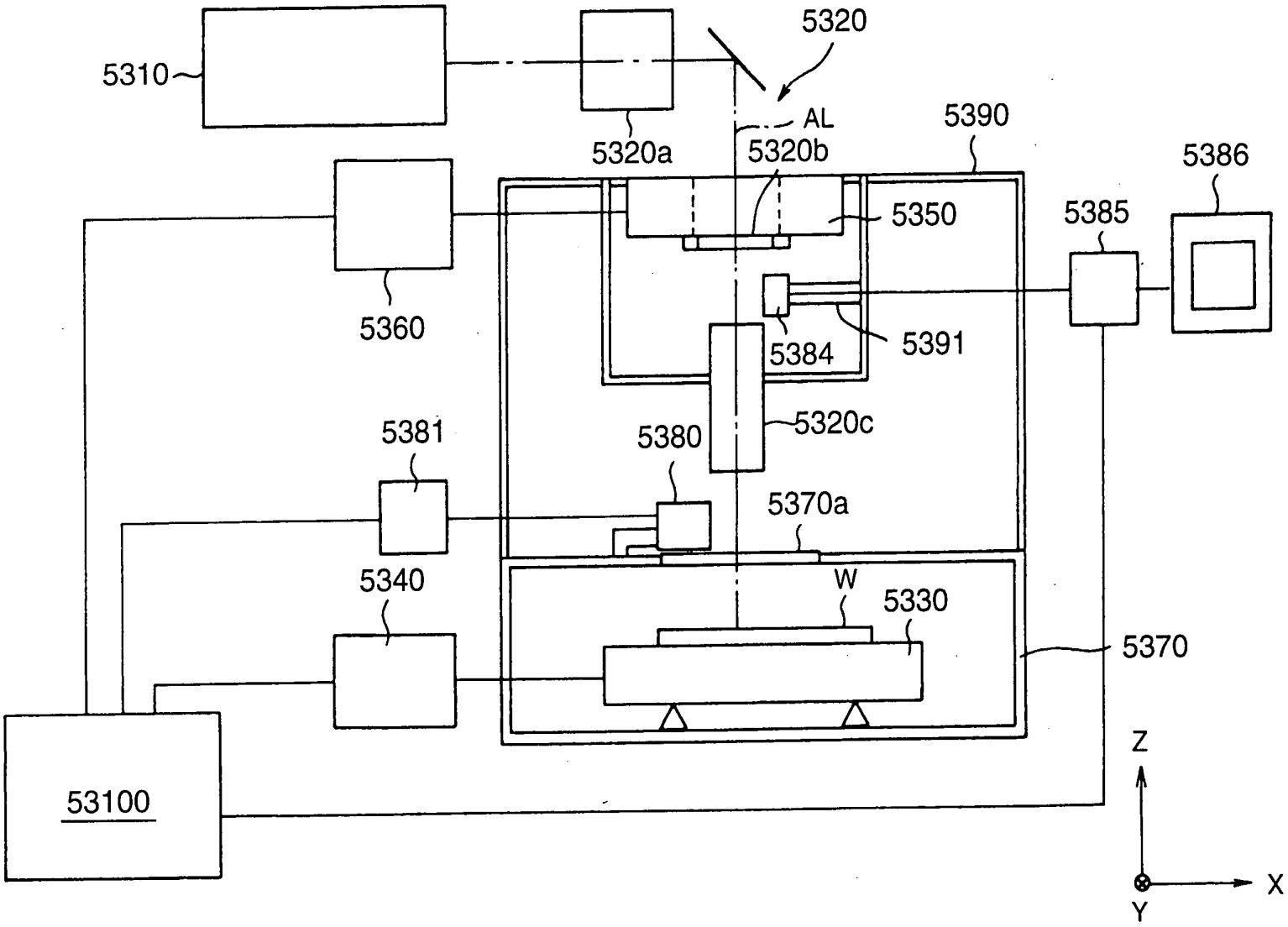

5310
5320
5320a
AL
5320b
5390
5386
5350
5385
5360
5384
5391
5320c
5381
5380
5370a
5340
W
5330
5370
53100
Z
X
Y

FIG.52